Food Manufacture

Incorporating Canning, Packing, and Preserving

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Harvest Home.

FROM ALL over the country there are reports of a bumper harvest of wheat, ready exceptionally early. In the South of England a good deal of corn was carried even in July, and in Scotland cutting became general on August 1. Undoubtedly the weather we have experienced this year has suited wheat more than any other crop, and there is no doubt that the quality will be above the average for native wheat. We have seen several samples of the new crop wheat grown in Hampshire and East Anglia, and the quality seems exceptionally good. The moisture content is lower and the protein content higher than has been the case for many seasons. If all can be "safely gathered in ere the winter storms begin" millers will have less cause than usual for their grumble against English wheat. The quota has encouraged extra acreage, and the weather has favoured even spring wheat, so that the wheat farmer will do very well.

Barley also promises well. It is the best crop on the light land of the Lincolnshire Wolds, and Norfolk and Suffolk report excellent crops. The yield may suffer a little, however, as some of the late sown barley has dried off too quickly in the hot sun. On the other hand, oats have not done very well, and the yield of sugar beet is likely to be lower in Essex, Suffolk, and the light soil districts of Norfolk and Cambridgeshire which require abundant moisture. Potatoes everywhere are excellent and practically free from all disease.

The Empire Marketing Board.

It was officially announced on August 8 that the Empire Marketing Board was to be done away with. Thus, after seven years of faithful and useful and not expensive service, the greatest of all marketing boards, one that embraced the claims and requirements of the whole Empire, and did so much to educate public opinion as to the resources and potentialities of our colonies, is to be abolished, at a time when the Government is indulging in an orgy of creating all sorts of home marketing boards from hops to hens and pigs to potatoes. It is difficult to understand why this Board, with its well-thought-out organisation for publicity, not only by its artistic and educative posters, but by films and leaflets distributed to schools, coupled with the enormously valuable research work carried out at the Imperial Institute, should be abandoned. Even if the various colonies wish to carry out their own publicity schemes, there is no reason why the central unit, which is really the only means of correlating the various products and placing them in proper perspective, should be eliminated. In a spirited leading article on the subject, *The Times* of August 9 points out that the matter will certainly be raised in Parliament again after the recess; but even if this does happen, we fear the damage will have been done. Teams will have been disbanded, ideas scattered to the four winds, a bolt will have been dropped into the cog wheels of the machine, and the task of starting it up again and building fresh teams will be difficult and costly. It seems to be one of the most shortsighted, muddle-headed, and weak-kneed actions of which even the present Government has proved itself capable.

Drying Plants.

We understand that further use is being made this summer of drying plants for conditioning both fodder crops and corn. A considerable amount of lucerne is being cultivated round Swaffham in Norfolk for which a large-scale drying plant has been erected. It was found last year by extensive experiments that grass and other green fodder, cut at a young stage, and artificially dried,

makes an exceptionally valuable winter feed for dairy cows and other stock. The plant used for this purpose can also be used for corn, and it has been found that with the methods now employed there is no danger of affecting the germination of the corn—a point about which there has been some apprehension. It is well known that the relatively high moisture content of English wheat renders storage difficult, and much good wheat has been spoiled, from the milling point of view, owing to the development of a musty smell. In a climate such as ours, it is more important than in others that are more favourable, to see that cereal products are dried sufficiently to allow for their safe storage. In this connection an exceedingly interesting article on "The Drying of Agricultural Products" was contributed by Hurst and Gordon to *Agricultural Engineering* (October, 1932, p. 261). Those interested in the subject should certainly consult this paper.

Winter Fodder.

In contrast to the attempts being made to dry fodder for winter use, we have the interesting possibility of the production of green fodder in winter. At the National Institute for Research in Dairying at Shinfield, a German process for providing a continuous supply of green fodder for livestock is being investigated. By a development of intensive culture practised in the laboratory, by which grains are germinated rapidly in a nutrient salt solution, it has been found practicable to produce a continuous supply of young herbage much appreciated by dairy cows. Maize is the first grain to be used, but it is proposed to make further trials with oats. The grain is germinated in a series of zinc trays, and in the space of a few days a thick growth of yellow shoots is produced which, according to the German reports, make a valuable feed. At Shinfield trials are being made to see how this food affects the quantity and quality of the milk yield of dairy cows and whether the feeding of such young growth in winter has the same results on the cows as the spring flush of young grass in the pastures. The idea doubtless has much in it.

Eggs in Food Pastes.

Some interesting work has recently been carried out in Italy on the detection of eggs in food pastes. If eggs are heated for 10 minutes in water, shelled, and mixed to a homogeneous paste and then placed in contact with a pepsin hydrochloric acid solution with a pH of about 1·5, the acidity of the solution shows an appreciable diminution within a few minutes. If wheat flour is used instead of the egg paste, the acidity of the liquid either remains constant or increases slightly. This difference in behaviour may be used to detect the presence of eggs in food pastes. The method may also be used to determine approximately the amount of egg present.

Light and Fats.

According to Lea (*J. Soc. Chem. Ind.*, 1933, 52, 146-148 T), light is one of the factors accelerating oxidation in fats, and direct sunlight may increase the rate in its initial stages by anything up to about 10,000 times. The effect of light is not proportional to its intensity, and once rapid oxidation has started removal of the exciting source will not stop it. Both ultra-violet and visible light accelerate the oxidation, the former probably the more effectively. Of the visible spectrum, light in the yellow range region is the most active, and green and the far red are the least active. Coloured wrappers used to protect foodstuffs should, therefore, have their light transmission curves determined to ensure the cutting out of the most active wave lengths. In Lea's paper, curves are given demonstrating seasonal fluctuations in the ultra-violet components of sunlight through increased atmospheric absorption at low sun altitudes. Readers may remember that we commented on similar work by Coe and LeClerc in our issue of November, 1932.

English Walnuts.

The annual reports of several research stations afford ample evidence that discoveries of the utmost value to the food industry are being made. We have space here for brief reference to two only of these institutions.

At the East Malling Research Station extensive trials have shown that the poor quality of the English-grown walnut is capable of great improvement. The present trees bear very inferior nuts; many never bear a crop at all. These nuts become mouldy or shrivelled and useless within a few weeks. The Annual Report gives suggestions for effecting improvements in the cultivation of the trees and the storage of the nuts. Those interested in the matter are invited to get in touch with East Malling.

> "A woman, a dog, and a walnut tree,
> The more you whack them the better they be."

Pickled Walnuts.

This question of walnuts is important. One has only to recollect the enormous consumption of cold beef and pickled walnuts in this country and the large consignments of green nuts imported from Belgium for the purpose. Our climate is equally suitable for walnut cultivation, and there is no reason why we should not be self-supporting in the matter of pickled walnuts. Now that East Malling is tackling the question so thoroughly we look forward to the time when trees are grown for their pickling nuts in the same way that to-day plantations

of apples are grown definitely for culinary or for dessert purposes.

Food Research.

The work carried out under the Food Investigation Board continues to gather speed, judging by the growing size of the Annual Reports and the importance to industry of the results contained therein. The Report for 1932 has just been issued; certainly it is the event of the year in food science. For the sum of five shillings it provides mental fodder for a whole twelve months of cogitating. An unworthy attempt is made in the rest of these notes to review the more striking discoveries of the F.I.B.

Gas Storage of Apples.

Remarkable progress has been made in the commercial gas storage of home-grown apples, employing controlled proportions of carbon dioxide and oxygen in the atmosphere of the store by means of regulated ventilation. Gas storage in this country has rapidly doubled and now amounts to some 1,750 tons. Another 1,000 tons is known to be planned, and there is little doubt that in a few years the amount will be ten times what it is to-day. This accommodation is, of course, additional to that, amounting to some 8,000 tons, for the ordinary cold-storage fruit.

The report contains particulars of the conditions found at the Ditton Laboratory to be most suitable for the gas storage of common types of apples.

Cold Storage of Apples.

As regards the prolonged cold storage of home-grown apples, it is shown that a variation in the storage temperature of only 1° to 1½° F. may have a pronounced effect, not only on wastage from fungal rotting in the days following removal from the store, but also in losses from internal breakdown (internal browning during storage).

Apple Vapours.

Arising out of the remarkable observation by Elmer in America that certain volatile products given off by ripe apples retarded the sprouting of potatoes, it has been found that the germination of seeds is delayed by exposing them to air which has passed over ripe apples. The evidence, though not yet complete, points to the substance responsible for these curious phenomena as being ethylene or a body of a similar nature. It should be noted that in spite of this slowing down of the growth of seedlings, their rate of respiration is not affected.

There are indications that bananas also, during part of their life, produce a similarly active substance.

The Climacteric.

Another interesting observation is that in the storage life of all fruit there comes a time when the respiratory activity rises suddenly for a short time and then falls. To this time of crisis in the life of the fruit the term climacteric is applied. It has been observed in the apple, tomato, and banana. The yellowing of the skin and the softening and sweetening of the flesh of a banana all take place after it has passed through the climacteric change. The "ethylene" given off by apples has been found to hasten the ripening of green bananas and young apples.

One of the secrets of a long storage life is to keep the respiratory activity of the fruit low. Make them live a quiet life and breathe slowly!

Fruit Diseases.

It is expected that a clearer understanding of diseases will be obtained as progress is made in the study of "ethylene" vapours and the climacteric. For example, the internal browning of apples is associated with too low a temperature while passing through the climacteric. Also, the superficial scald (browning of the skin) is no doubt determined during this critical period and seems to be associated with a high proportion of carbon dioxide in the store.

Tomato Storage.

From information given in the F.I.B. Report it would appear that a storage life of five weeks for English hothouse tomatoes is already a commercial proposition. Another point of interest is that summer-grown fruit tolerates a lower temperature of storage than autumn-grown fruit. For the successful storage of tomatoes both temperature and atmospheric composition must be controlled. Probably the best results are obtained at 50° to 55° F. in an atmosphere containing 5 per cent. of oxygen and 5 per cent. of carbon dioxide.

Chilled Beef Storage.

The Report records important results in the storage of chilled beef. In ordinary air chilled beef can be kept in store for about one month, after which it rapidly deteriorates. This period permits of marketing of chilled beef from the Argentine in this country, but is too short in the case of Australian and New Zealand beef. It has been found, however, that comparatively low concentrations of carbon dioxide prevent the growth of the moulds and bacteria commonly found on chilled beef. Roughly speaking, a concentration of 10 per cent. will, it is stated, double the storage life of hind quarters of chilled

beef. Experiments have shown that concentrations of carbon dioxide above 20 per cent. destroy the freshly killed appearance of meat so important in marketing.

Attention is now being turned to the question of applying these results to commercial conditions. There is, for instance, the problem of overcoming the leakage of carbon dioxide from storage chambers. Experiments are also in progress in Australia on the preparation of chilled meat for transport and on the effects on storage of the past history of the meat.

Storage of Bacon.

The F.I.B. experimenters, under the direction of Dr. E. H. Callow, have found that bacon can be stored successfully in carbon dioxide for nine weeks at 5° C. The Report has a very interesting section on bacon curing which will repay careful study. A comparison is made between tank and dry-salt curing, the former being practised in Denmark and the latter largely in England. Experiments show that the dry-salt cure gives a more palatable product, although it has been claimed that tank bacon is better fitted for the organisation of the factory and is cheaper.

Chilled Pork.

While frozen pork keeps remarkably well, chilled pork fetches better prices. So far neither Australia nor New Zealand can export chilled pork to this country, since after three or four weeks micro-organisms grow on the skin and the fat develops rancidity. Gas storage experiments have accordingly been extended to pork. In one experiment a whole carcase of pork was stored at −1° C. for seventeen weeks. During this time the lowest concentration of carbon dioxide in the storage atmosphere was 92 per cent. and the highest concentration of oxygen 2·1 per cent. The carcase was then sent to Smithfield for examination and testing, with highly satisfactory results. The twenty people who took part in the tests agreed that the pork was excellent, was considerably more tender than any they had previously eaten, and resembled chicken or veal rather than pork.

Frozen Meat.

Other work on the storage of fish and meat has cleared up the relation between temperature and the rate at which tissues deteriorate in the frozen state. Broadly speaking, the rate of deterioration is greatest at a temperature of −2° to −3° C. It practically ceases at −20° to −25° C. Three factors are stated to be concerned in this result. The process of freezing itself is responsible for two of them. It increases the concentration of salt by removing water in the form of ice, and this, in its turn, causes a change in the acidity of the tissue. The fall of temperature alone gradually decreases the rate of chemical change, and it is the interplay of these factors that determines the rate of deterioration in storage at any given temperature.

It should be noted that the degree of infection to which meat is subjected during handling is as important as the control of temperature in determining its storage life.

The Butcher's Store.

Related to this there is the problem of the small refrigerator, which is discussed in the Report. In the large store, carcases are uncut and therefore protected from bacterial invasion by a layer of fat and connective tissue, enabling the meat to be stored for periods up to eight weeks at 0° C. In small joints, however, the exposed, moist surfaces of lean provide excellent soil for bacteria, which in time (depending on temperature and degree of infection) yield odour and slime. At 60° F. the time is one day only; at 32° F. it is 17 days. As regards degree of infection, at 32° F. and 100 per cent. relative humidity, with a bacterial count of 43 per square centimetre, the period is 18 days; but with a bacterial count of 17,000 per square centimetre, it is only 10 days.

Other Researches.

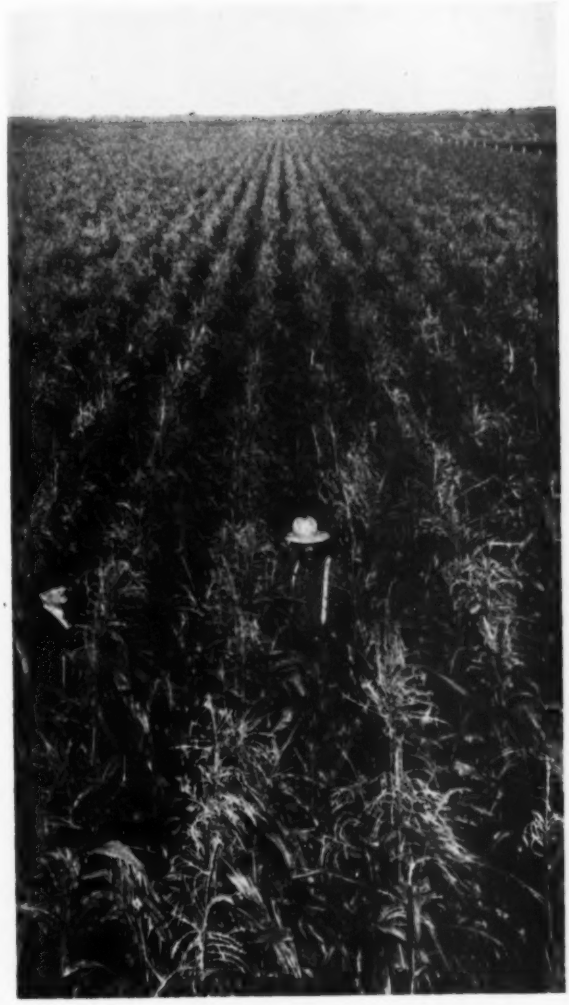
It is unfortunate that space does not permit our discussing the rest of the F.I.B. Report. The work on fish freezing, smoking, and fish liver oil at the Torry Research Station, and the investigations by T. N. Morris and J. M. Bryan into canning, the concentration of orange juice, and the freezing of fruits and vegetables, are left over for future consideration.

Food Industries Weekly.

Readers will be interested to learn that a new publication is this week being issued from the same address as FOOD MANUFACTURE. Its title is *Food Industries Weekly*.

FOOD MANUFACTURE will continue entirely unchanged in its scope and outlook, whereas the new weekly will be devoted exclusively to news, and will publish up-to-date information of interest to every department of the industry.

Regular features will include technical, administrative and sales news, market reports, food politics, patents, publicity, and packaging. Other interests to be catered for include transport, the factory farm, international food regulations, publicity developments, and so forth.



MAIZE

The composition, uses, and cultivation of maize and the preparation of maize products, described by T. H. Fairbrother, M.Sc., F.I.C.

ALTHOUGH WHEAT is regarded generally as the most important of all cereals, it has a close rival, if not an equal, in maize. It has been stated that "No other plant we grow will produce 3,172 lb. of digestible food on one acre of land at so little expense. No other crop yields the farmer so large a return for his labour as Indian Corn. It is the King of Cereals." In America the national prestige of this giant grass is voiced in the saying "Corn is King."

Production.

The average world wheat crop is round about 550 million quarters, while that of maize is only slightly less. To quote Broomhall's figures for 1932, the world production of wheat was 573 million quarters and of maize 512 million. As to imports into the United Kingdom in 1932, we took 104 million quarters of wheat valued at 32½ million pounds, and 53 million quarters of maize worth 11½ million sterling. The production of maize has steadily increased in recent years, and in 1932 about 10 million quarters more were produced than in 1925. It is also significant that the imports of maize into the United Kingdom in 1932 were about double those in 1925. There can be little doubt that this increase in production is due, firstly, to its good yielding habit (an average of 35 bushels per acre has been obtained over the five central mid-west states in the U.S.A.), and, secondly, to its high food value for both man and beast.

Nutritive Qualities.

Maize is now included in the diet of animals wherever it is grown or can be imported profitably. Its use as food for man cannot be overlooked. In many places as much as 25 per cent. is mixed with wheaten flour for bread making; cornflour is used instead of arrowroot for biscuit manufacture and to a large extent for making porridge. One has only to think of the polenta of Italy, the corn bread, succo-tash, fish batters, corn fingers, and corn on the cob of the U.S.A. and the mealies of Africa to realise what a variety of palatable and nutritive dishes are obtainable from maize. It has been stated that an excessive amount of maize in the human diet is a contributory cause to the development of pellagra, but it is not at all certain that anything inherent in maize is responsible for this. We shall see later on in this article that maize actually does contain vitamin B in considerable quantities and includes an antineuritic factor as well as an anti-pellagra factor. Given a normal balance of food, with the requisite vitamins, the starchy portion of maize, in spite of its inferior protein quality, should prove a very useful part of man's diet. The so-called "deficiency diseases" are not yet sufficiently understood to allow of dogmatic statements about any individual foodstuff. It is certain, however, that in maize we have a plentiful supply of starch, which indisputably is to be regarded as one of the integral parts of human diet. With maize, as with all other starchy foods, it is necessary to keep it in proper proportion and to balance it with other materials.

Combined Corn Harvester and Silage Cutter.
(By courtesy of the High Commissioner for Canada.)

History.

Maize seems to have been known from time immemorial. When America was discovered by Europe the plant was widely grown by the American Indians—hence the name Indian Corn—and its cultivation has been noted in many parts of the world, though it has been designated by a variety of names. In England it is popularly known as Indian Corn, but the French call it Spanish Corn. The South Africans call it Mealies, and while in Turkey it is known as Egyptian Corn, it is called Turkish Wheat in Holland and Hungary. In Egypt ownership is again refuted, as it is termed Syrian "Dhurra." In America it is just called "Corn." From these designations it is seen that the cereal is known familiarly almost all over the world, but no one seems quite sure of its place of origin. For centuries it has been grown in the East Indies and China, and nowadays it is grown fairly extensively in Australia.

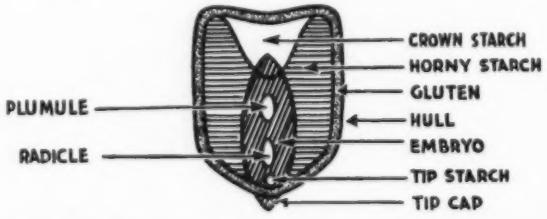
Cultivation.

For its satisfactory cultivation corn requires somewhat different conditions from wheat. It should have a long, hot summer, warm nights, and, unlike wheat, frequent summer rains. The latter condition is essential, so that in places with very dry summers such as Chile, California, and North Africa, although the temperature is high enough, maize cannot be grown.

Botanically the maize plant is a true cereal of the genus *Zea*, of which the main varieties are *Z. tunicata* (pod maize), *Z. everta* (pop corn, with a small oval grain pointed at both ends), *Z. indurta* (flint maize), *Z. indentata* (dent maize, which is characterised by a dent along the distal end of the grain), *Z. amylacea* (soft maize), and *Z. saccharum* (sweet maize). The varieties that come into commerce are the flint and dent maize. The kernels of the flint variety are all glossy and hard, whereas in the case of the dent maize they are only glossy in areas adjacent to the sides, and the germ lies in a starchy, opaque area. In growth the plant varies considerably, its height being from 5 to 8 feet. The staminate flowers develop at the top of the main axis, where they pollinate, and the pistillate flowers, from which the grain develops, are borne on a spike in the axil of one of the lower leaves of the same plant. These latter flowers are arranged regularly round the spike. There may be as many as twenty-four rows with fifty florets per row, each of which ripens to a single grain attached to the spike, to form what is familiarly known as the corn cob.

The Maize Grain.

In order to understand the types of products that enter into the grinding and flaking of maize it is necessary to have some idea of the structure of the maize berry. Roughly, the various important parts may be visualised in the accompanying sketch.



From this it is seen that there are roughly four zones to be considered:

1. The hull, or outer skin, corresponding to the bran separated in wheat milling.
2. The crown starch endosperm.
3. The horny starch endosperm.
4. The embryo or germ.

The bulk of the fat is located in the embryo, though a certain amount is found in the horny endosperm, and, as would be expected, most of the starch as well as protein is to be found in the endosperm. In considering maize as a feeding stuff, it is necessary to bear in mind the very low ash content. This deficiency in mineral matter should be balanced by the use of products rich in mineral matter in conjunction with maize.

Milling and Cleaning.

Before milling maize some form of cleaning is usually adopted, though for the production of whole maize meal this is often omitted. If the maize is to be dry cleaned the procedure is very similar to that used for wheat. The grain is passed over separators to remove rubble, etc., then over a magnetic separator to remove any nails or pieces of iron. It is then scoured and aspirated. After these operations the grain is frequently steamed, but this is not done when wholemeal is to be made.

The manufacture of flaked maize in America differs from that in England. In Britain there are various regulations that render it necessary to make every product as good as it can be, regardless of the residues. In America the idea is to make as many different products as possible at the same time. Thus, in America "degerminators" are frequently employed to remove the germ, whereas in Britain, where the flakes are sold under a guaranteed oil content, the germ, being the richest source of oil, is left in by those manufacturers who declare a high oil content. If a degerminator is employed it is used after the grain has been cleaned and steamed. In it the bran skins and germ are removed and the rest of the grain is roughly broken up. In all corn, however, the feed for a flaked maize plant is reduced to the form of "grits," which are graded as to size and purified from fine dust by aspiration. The grits are gelatinised in a machine called a gelatiniser, in which the hard starchy granules are burst by steam under pressure. After this the gelatinised particles are flaked by passing them through pairs of very heavy rolls. The flakes are then dried and graded through sieves under aspiration. In this way dust is removed and oversized flakes are sifted out and very small flakes dressed out. The "flow" of machinery for grinding and flaking maize is shown in the accompanying illustrations.

General Uses.

Maize is used to a great extent in the distilling industries, and when mixed with malt and other cereals in the mash a good yield of alcohol is obtained. It is also largely used in yeast factories where no spirit yield is now sought, the only products being carbon dioxide and yeast. In the brewing industry maize acts as a food upon which the surplus diastase of the malt feeds. In this case the maize germ is removed by a milling process, because any oil causes trouble to the brewers by yielding a cloudy beer and a faulty yeast plant. After the germ is removed from the maize the broken particles are thoroughly cooked (gelatinised) at a low temperature, and while still moist are rolled into thin flakes and dried down to 10 per cent. moisture. In this form they present a large area to the liquor in the mash tun and are readily soluble. On the Continent, brewer flakes or "quick malt," as it is called in the U.S.A., is slowly gaining adherents, but the most common practice there is to convert the grits by high pressure cookery and then run the cooked grits into the mash tun.

Recently a large increase in the feeding of cattle by cooked flaked maize has taken place, partly on account of the low price of maize and partly because it is a cooked food and animals fatten quickly on it. It is not generally used alone, but nearly always mixed with miller's wheatfeed.

Several of the manufacturers of brewer's flake extract from the maize germ a proportion of the oil before selling the balance as "maize germ meal." About 2 per cent. of oil can be recovered from maize, and, as the oil is worth about £20 a ton, it is well worth while, since the feeding meal is not seriously reduced in value. The bulk of maize oil finds its way into soap, but it can be refined, and doubtless some portion of it is used for edible purposes. In America it is used as salad oil and as a shortening agent. It is rather remarkable that the large maize millers do not investigate this question more

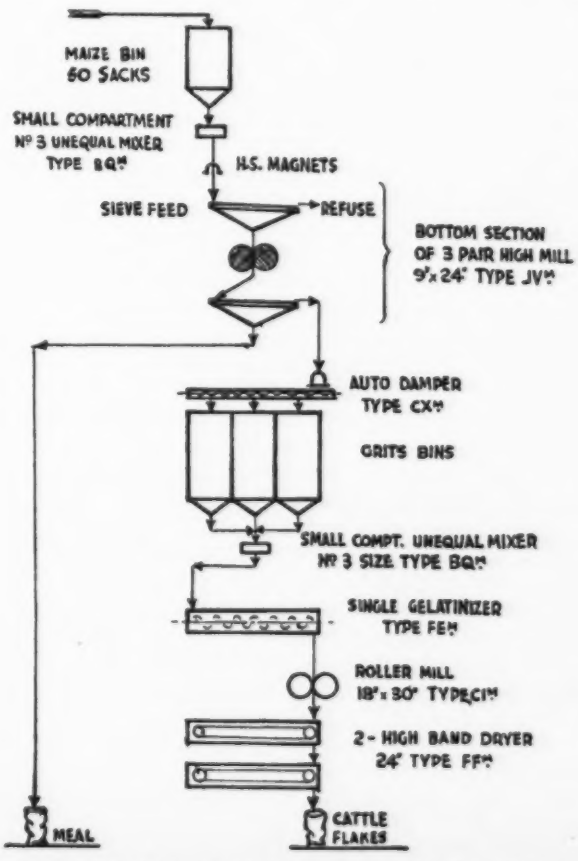
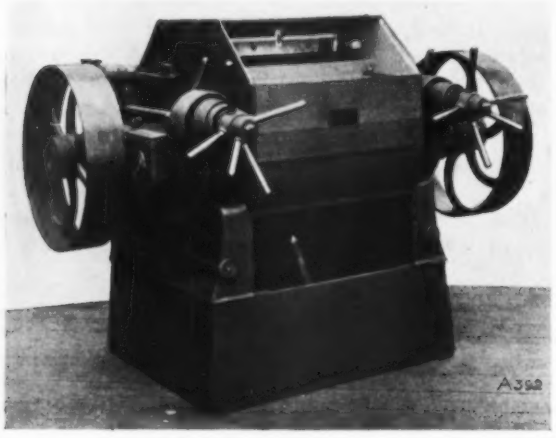


Diagram of a Maize Flaking Plant. Capacity 6½ to 7½ cwts. per hour.

(By courtesy of Thomas Robinson and Son, Ltd.)



Maize Flaking Mill.
(By courtesy of Thomas Robinson and Son, Ltd.)

thoroughly, as it has been proved (*Journal of Agriculture*, August, 1932) that the maize with a proportion of its oil extracted is a better feed than one with its natural amount.

Maize Products.

Corn and Cob.—There is only one product, an unusual one, known as "cob meal," that consists of the ground whole husked ear. This is really corn and cob meal. The low feeding value of the cobs and the difficulty of grinding them militate against the product. Parts of the cob, especially hard lumps of the woody zone and fragments of the thick and papery chaff elements, may be picked out and identified under the microscope.

Whole Kernel Products.—Corn meal, ground by millstones without separation of the bran or germ, is still used largely in the Southern States of America. On account of the presence of the germ the meal deteriorates rapidly, and so should be prepared and consumed on the spot. Large farmers usually have their own burr stones for grinding meal.

Coarsely cracked maize, known as "cracked corn," is very suitable for young poultry.

Decorticated Products.—The husked products are marketed both raw and cooked. The uncooked varieties differ in the degree of fineness, starting with hominy or corn grits and finally corn flour. The first consists chiefly of the horny endosperm, whereas the last contains more of the starchy endosperm with its preponderance of rounded starch grains.

Corn Flakes, which consist essentially of rolled and roasted grits, form a packed cereal food that is highly esteemed in America.

Puffed Corn is made from large lumps of the endosperm "exploded" by heat. The grits are heated under pressure and after a time the pressure is suddenly released.

Lye Hominy or *Hulled Corn.*—Originally this was prepared by the natives, who used wood ashes as the decorticating agent. It is now hulled by lye in canning establishments. The kernels swell to a considerable size owing to the distortion of the starch granules.

Corn Cobs.—These are very rich in pentosans and form a useful raw material for the manufacture of furfural, which, in turn, is the starting-point for certain synthetic resins. Adhesives are also prepared from the cobs. Every smoker is familiar with the corn cob pipes that are made by the hollowing out of the centre to the woody layer. At one time it was a common practice to adulterate wheat bran with ground corn cobs, but the fraud is now infrequent. Microscopic investigations by Winton readily demonstrated the addition.

Gluten Meal is a highly nitrogenous dried residue obtained in the manufacture of glucose. It consists of hard, round lumps with such starch as remains well disorganised.

Germ Cake is the residue from the manufacture of maize oil from the embryo separated by degermination. This is ground and produces germ oil meal.

Maize Oil.—According to Hopkins, the specific gravity at 15° C. varies from 0·9245 to 0·9262, the iodine number from 121·5 to 123·1. His calculation shows the composition of the oil to be cholesterol 1·37, lecithin 1·49, stearin (?) 3·66, olein 44·85, and linolin 48·19. Baughman and Jamieson examined corn oil pressed by means of an oil expeller from corn germs and concluded that the composition is:

Glycerides of:

	Per cent.
Lignoceric acid	0·2
Arachidic acid	0·4
Stearic acid	3·5
Palmitic acid	7·7
Oleic acid	45·4
Linolic acid	40·9
Unsaponifiable matter	1·7

Shriver, Nabenhaur, and Anderson (*J. Amer. Chem. Soc.*, 1927, 1290) have shown that the solid matter which separates when crude maize oil is chilled during the process of refining consists of a mixture of the two waxes, myricyl-*n*-tetracosanate and myricyl isobehenate.

Pop Corn.

The name "pop" refers more to the suitability of the variety (*Zea everta*) for making the American confection known as pop corn rather than to any distinctive botanical characters. The popping of corn, whether carried out in factories, by street vendors, or at home, consists of heating the corn in a covered wire cloth or thin metal container over a brisk fire with constant agitation. If the heat is too high the corn burns without popping. After a few minutes heating each kernel explodes and turns inside out into an irregular snow white mass, the whole being several times larger than the original kernel. To secure the best results the kernel must be cured, but not too dry, as a certain amount of moisture is essential for the swelling of the starch. Wibert found that if the moisture is insufficient, as in old corn, the corn does not

pop properly but at best only splits open. Quick heating is essential. By slow heating the kernel may be dried up and parched without popping. It is the cells in the denser part of the kernel, not the basic cells, that explode. According to Carr and Ripley popping causes an increase in ether extract, soluble starch, dextrin, and fibre, but a decrease in total starch.

Soft Maize.

This group is characterised by the entire absence of horny endosperm. Cazco, the best-known variety, has kernels up to 2·5 cm. long and 1·8 cm. wide. The outstanding characteristic is the starch of the floury endosperm with rounded grains up to 32 μ or even larger and the absence of polygonal grains. This maize would be specially suited for the production of starch, but apparently it is not so used to any large extent. Its starch, with nearly spherical grains and the absence of polygonal grains, would be unique among commercial starches.

Sweet Corn.

If the maize cob is gathered in the milk stage it becomes classified as a vegetable. In France it is known as "mais sucre," and in Germany as "Zukermais." Sometimes the whole plant is grown as a green fodder and for silage. Occasionally the mature shelled kernel is used for feeding, but it is best known as the seed for planting. The sweet corn differs in many respects from the ordinary field maize. The common colour is white, but Golden Bantam is yellow and Black Mexican is blue, and other varieties range from pink to red. In many microscopic characteristics sweet corn is distinct from ordinary maize, particularly in the nature of the starch cells and the presence of a soluble carbohydrate (probably a dextrine). Chemically there are also differences, as can be seen from the sugar, germ, and starch contents. Analyses carried out by Kedzie and Collier give the following figures:

	No. of Samples.	Sugar.	Germ.	Starch.
Dent Maize:		(Per Cent.)	(Per Cent.)	(Per Cent.)
a/c Kedzie ...	8	3·6-2·3	5·4-2·2	62·9-58·1
,, Collier ...	3	2·7-1·9	2·8-1·7	70·8-64·1
Flint Maize:				
a/c Kedzie ...	4	3·8-2·4	6·2-1·2	63·5-57·5
,, Collier ...	17	2·9-1·5	3·2-1·4	69·6-62·3
Sweet Maize:				
a/c Collier ...	7	6·8-4·8	22·7-14·5	46·1-39·5

There are several other varieties, such as Chinese Waxy Maize, Pod Maize (Spelzenmais), Teosinte Coix or Job's Tears (this is used as a substitute for beads on necklaces), Broom Corn, Kaffir Corn, and Milo Maize, but space will not allow of further details in this article. Their macroscopic, microscopic, and chemical characteristics are described thoroughly in *The Nature and Structure of Foods*, by A. L. and K. B. Winton.

Flake Drying Machine.
(By courtesy of Thomas Robinson and Son, Ltd.)

Composition of Flaked Maize.

Woodman and Stewart (*J. Agric. Sci.*, 1927, p. 60) analysed several brands of flaked maize in order to compare their feeding values. The protein varied from 10·56 to 11·24, crude fibre from 2·27 to 1·59, ash from 1·86 to 1·05, and phosphates from 0·95 to 0·45, and nitrogen free extractives from 81·86 to 79·8. It is evident that flaked maize is a fairly uniform product.

The Vitamins in Maize.

Considerable research has been carried out on this somewhat complex subject. Sherman and Axtmayer (*J. Biol. Chem.*, 1927, p. 207) concluded that the vitamin B of maize contained at least two fractions, an antineuritic factor, vitamin F, and an antipellagra factor, or vitamin G. Hunt (*J. Biol. Chem.*, 1928, p. 83) confirmed this and found that wheat and maize contain approximately the same amounts of vitamins F and G, but are richer in F than G. Hauge and Frost (*J. Biol. Chem.*, 1928, p. 197) made an interesting study of the distribution of vitamin A in certain kernels of crosses of yellow dent and white dent corn. They found that vitamin A is present only in kernels possessing a yellow endosperm. Hauge (*J. Biol. Chem.*, 1930, p. 161) found that in hybrid red maize vitamin A is associated with yellow endosperm and is lacking in the corn grain with pure white endosperm even when grown on the same ears as those possessing grains with yellow endosperm. There is a close physiological association between vitamin A and yellow endosperm character. The colour of the pericarp does not appear to have any effect on the vitamin A content of corn.

Composition of Certain Maize Preparations.

In 1929 a number of cereal preparations were examined at the Connecticut Agricultural Experiment Station. The

results obtained with maize products compared with one or two other cereal foods were as follows:

	Water.	*Ash.*	*Protein.*	*Fibre.*	*Carbo-hydrates.*	*Fat.*	*Calories per 100 gm.*
Cerealine ...	11·2	1·5	6·9	0·1	79·9	0·4	351
Jersey corn-flakes ...	7·7	0·9	8·5	0·3	82·3	0·3	366
Post toasties	11·7	1·8	6·6	0·2	79·4	0·3	347
Quaker corn puffs ...	12·0	0·4	8·7	0·1	78·5	0·3	352
Quaker grits	13·2	0·5	7·9	0·2	77·7	0·5	347
Quaker oats	10·8	1·9	15·9	0·9	64·5	6·0	376
Puffed rice ...	12·2	0·4	7·6	0·1	79·5	0·2	350
Puffed wheat	11·5	1·8	13·1	1·6	70·2	1·8	349
Kellog's bran	9·6	6·0	16·3	8·5	54·4	5·2	330

Corn Starch.

The preparation of maize starch is very important and provides one of the main outlets for maize. It is a specialised subject which does not fall within the scope of this article. Readers desiring details of this are recommended to read "The Manufacture of Corn Starch," by G. M. Moffett, in Walton's *Comprehensive Survey of Starch Chemistry*.

Dextrose in Medicine.

Dextrose is the sugar which occurs in the blood and tissues, and all other carbohydrates must be converted into it before being utilised by the body. Requiring neither digestion nor chemical alteration, it is the most rapidly absorbed form of carbohydrate when administered orally or by injection. It has, therefore, been recommended in many ailments. It lessens tissue destruction in starvation and prevents toxæmias of various origins in the presence of infections. It is a suitable form of carbohydrate for normal and most sick infants. There are several medicinal dextroses on the market, and in one, at least, vitamin D has been added.

Conclusion.

It is impossible in an article such as this to go into very intimate details, but in the space available an attempt has been made to give the reader a bird's-eye view of the varieties, properties, characteristics, and possibilities of this very important cereal. The world production is increasing and the possibilities that arise for its greater use must not be overlooked. Its potentialities as a foodstuff are great, and we shall doubtless see a wider application of its products in the near future.

ITALIAN MARGARINE PRODUCTION

COMPARED with those countries producing large quantities of margarine, Italy takes secondary place. The use of margarine and butter in Italy is not widespread because olive, maize, and even linseed oils are used extensively for edible purposes. Since the war, however, the production of margarine has increased. During the early stages in the development of this production, numerous small factories sprang up, as there was no legal enactment dealing with the matter. Later, as legal action was taken regarding the quality of the material, some of the less efficiently run factories were forced to shut down. Now, Italian margarine must not contain more than 16 per cent. water, and must be free from added dyestuffs. All fats, except olive oil, butter, and lard, must have an addition of sesame oil in a quantity which can readily be detected, and the margarine must be clearly marked. Butter may not be added owing to the yellow cast given to the margarine. On this point the legal opinion is far from clear, in spite of many prosecutions. Many makers mix 30 to 35 per cent. of butter with the margarine, selling the mixture as a special margarine.

During the past year, says a writer in *Allg. Oel u. Fett Zeit.* (1933, p. 78), the control of factories has been tightened up considerably, resulting in a decrease in production but an improvement in quality. In 1932, the total production of margarine in Italy averaged about 250 to 300 kilos. per day. The Italian factories are free from foreign control, the most important firms being: Margarineria Arrigoni S.A. Crema; S.A. Van den Berg, Villastellone; Margarineria Italiana San Carlo, Genoa; Conti de Moretta Bra., Turin; Cremerie Cremonesi, Cremona; Chierichetti e Torriana, Milan.

The oils used are produced mainly in Italian mills, owing to the high import duties on imported foreign oils. Copra from French and English sources and whale oil from Norway are used, the purified oils being prepared in Italian mills. Most of the oil producing factories are controlled by the Gaslini concern of Genoa. There are several small independent mills running mainly on water power producing maize, linseed, and olive oils which are not used in the margarine industry.

The following German products are used in the Italian margarine industry: Nickel sulphate, kieselguhr, bleaching earths, and decolorising carbons. Lecithin is used in most factories, while butyric acid is used in small amounts only.

Egg yolk and glucose are not used, as they affect the keeping qualities of the product during the summer months.

At the beginning of the present year a price convention was formed, which fixed the minimum price of 3 lire per kilo., against 2·7 lire, previously, for normal margarine.

PURE FOOD LAWS

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An Epilogue to the English Jam Standards Controversy

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MOST OF our readers will recall the discussion carried on in the May, June, and July issues regarding the implications of the recently adopted jam standards and their shortcomings. Mr. S. Craig Bain, of the African Canning and Packing Corporation, Ltd., who initiated the discussion, has now sent us the following letter, which seems to us to furnish a very adequate epilogue to the whole controversy:

As the person responsible for throwing into the pond the pebble that has resulted in so many interesting, and in some cases curious, ripples, I may perhaps be permitted to express a few comments on the letters that my communication provoked.

My first duty is to the original "July Contributor," or "Author," as he is captioned, and to say that his second contribution makes his standpoint much clearer than did his first, which gave an impression that he applauded the standard of first quality jam as accepted in Britain, with corresponding deprecation of the standards of certain other countries. I felt that he had not sufficient grounds for such conclusions and so decided to challenge them. Whether this was consequent upon my hasty reading or his failure to make himself fully clear does not now matter; it is sufficient to say that there is nothing in his second letter (*i.e.*, that on page 206 of the June issue) at which I am prepared to cavil.

Prevailing Low Standards.

We are in agreement that the establishment of some standards is better than none, that the standards in themselves are low, and that the food laws of England are "rather out of date." Our original misunderstanding has caused the focussing of attention upon a highly important subject, and no apology need be tendered.

Mr. Henville, in the May issue, is not very convincing. He says that the *whole point* as to whether a country's food laws are behind the times lies in the question of whether standards are desirable or not. Surely this is not correct. Does not the comparison of modern Pure Food Acts with old ones reveal other points? He adds, "It would be a great mistake to adopt hard and fast standards for every food." One is brought to enquire what the animadversion is aimed at. Would Mr. Henville have fast and loose standards instead of hard and fast, or is the meaning to be found by stressing the words "*every food*"—but who asked for standards for every food, either hard standards or loose ones?

I cannot follow Mr. Henville in his statements that a Government setting out to provide pure food laws must be ruled in turn by compromise. Surely the authority fixes its purposes on reason. Then, too, I think his reference to lemon curd was unhappy because in that line the public has little notion of the degree of padding to which it is subjected, and his complacency in regard to the adulterated character of much lemon curd does not harmonise with his later recommendation that the labels should give not only the constituents of a product, but the actual composition—presumably the percentage of each constituent. On this point he is comparatively clear, but I'm not sure but that he would find standards more practicable.

The contribution of "Another Authority" (pages 204-205, June issue) deals only with whether the jam standards are or are not justifiably low. Several of his points are made difficult to answer by their qualification —*apparently* meet the public requirements—they give the public a square deal *so far as they go*—but in the main the argument is that because the jams of super fruit percentages do not command as big sales as the ruled fruit percentages, the latter must be regarded as being "what the public require." Is it not possible, however, that the sales of really first grade jams have not had a fair chance because of the laxity in the law that permits of rival cheaper jams being called "Full Fruit Standard," meaning first quality? Would not the critic who is invited to back his opinion financially naturally decline to do so until the food laws were altered to give him protection from the masquerader?

Undue Complacency.

"Another Authority" leaves the line of clear argument when he brings in the position of the purchaser who wants the cheapest and is indifferent to quality. This buyer's position was never challenged by me and he has fallen into bad argument. He is again on unstable ground when he says that the public is not buying "a pig in a poke" and the standards have been advertised so that there can be no deception. Mr. Bagnall, on page 207, in his penultimate paragraph answers "Another Authority" very completely.

Mr. Tankard's contribution does not call for extensive review. In the main he is giving voice to truisms, but he errs surely on stating that it is *beside the point* that the standards adopted are not high enough. That was the main point of the original criticism, so how can it be "*beside it*"? In that part of Mr. Tankard's letter appearing on page 206, he is shying at self-conceived coconuts, and, my!—how he knocks them down!

There is nothing I have said that is of unkindly intent, and it must be appreciated that I did not open the correspondence with the purpose of offering criticism upon affairs which were no concern of mine. I wrote only to disturb what I felt was an undue complacency in regard to the British jam standards, coupled with a certain indifference to the value of the standards of other countries, which I thought the original contributor had in mind, but which, from his later letter, I appreciate was not so.

No one will contend that the correspondence upon this subject has been of other than a healthful character.

Progress in the Baking and Confectionery Trades

The position reviewed by Edmund B. Bennion, M.Sc., A.I.C., National Bakery School, London

THE INTERNATIONAL Baking Trades' Exhibition in September each year forms a convenient point at which a review of the progress which is being made in the baking and confectionery trade can logically be brought forward. Evolution is a gradual process bringing about developments of such a nature that progress is not always noticeable during the process, and it is only by the results of the process, when a new final product has emerged, that the sureness of the evolution is realised. Revolutionary changes do not often take place in any industry. Occasionally such changes do occur, but generally only in part of the industry, or more particularly in these days, in parts of machinery used in an industry.

Machinery.

The development of machinery in the baking and confectionery trades has proceeded apace during the past few years, and with each successive year new machines have come to the forefront which, by their incorporation of new ideas and increased efficiency, have proved most successful in everyday practice. This development on the manufacturing side has been followed by greatly increased usage of the machines in the trade.

In the realms of bread making, progress has been made in the development of automatic plants, so that anyone viewing or working a 1933 production is surprised at the deficiencies of the 1923 product. Fundamentally the plant is the same, but it is the refinements and adjustments tending towards increased output, greater uniformity of product, and increased flexibility in its usefulness for different types of bread, which strike one so forcibly. The designing of smaller units has received consideration, and plants suitable for an output of two to three hundred sacks a week have proved popular.

Oil firing has become more popular, but it will be a matter requiring constant attention if this is to increase, as the recent tax on fuel oil is a tremendous tax on all those industries which have developed oil firing. Now we have great enthusiasm exhibited in Parliamentary circles over the conversion of coal to oil, and it seems likely that this will be followed by an official campaign to burn fuel oil and so help home productions. For this privilege every user will be called upon to pay an extra tax on the oil itself. Is this likely to help oil firing development, with its minimisation of smoke pollution and production of greater cleanliness in all food producing factories? *It is time all the food producing industries co-operate and agitate, and do not cease their agitation until the tax has been repealed and progressive developments stimulated instead of being strangled.*

Electricity and gas have entered into considerable favour and many small users have found electricity a paying proposition, while gas firing is increasing in popularity for many travelling ovens other than the biscuit oven, for use in confectionery production. A tax on fuel oil is likely to stimulate the use of gas ovens more than any other factor, since the price of gas is a reasonably constant one. Moreover, such ovens are adaptable, being designed for bread as well as confectionery and are relatively cheap to install.

Dough mixers have been developing, and the most popular are the open pan type. This year has seen a new machine, the "Rotex," increasing in popularity. This machine has resulted from a revolutionary change of principle—namely, having a fixed, adjustable working arm and a bowl revolving at what, for such mixers,

The "Rotex" Mixer.
(By courtesy of Peerless, Ltd.)

is a relatively high speed. It is suitable for any kind of bread doughs, for large quantities of shortbread or marzipan, or for bringing about a thorough mixing of any ingredients. It has many uses, of course, outside actual baking. The capacity of the machine is about half a sack of flour or approximately 200 lb. of mixed ingredients.

Other machines which have received attention are those in which there are two working arms, and particularly the Collins, in which these arms work with a reciprocating motion instead of the more general simultaneous motion.

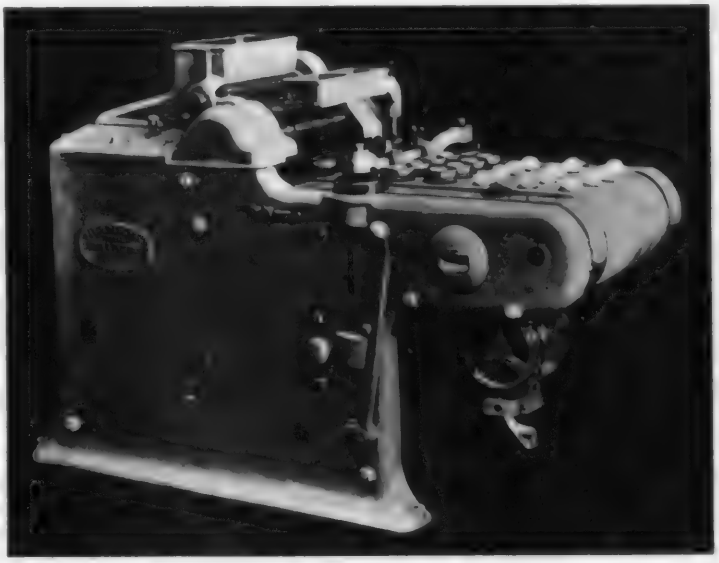
Safety guard devices for dough mixers have also received attention.

Bread moulding machines have developed, and the demand for these is increasing. This, no doubt is partly influenced by the more intense competition which exists in the trade, demanding uniformity in the finished bread not only in appearance but also in texture. Further, with the varying qualities of flour and often the lack of work put into moulding the loaves by the operatives, machine moulding minimises to some extent the persistent holes which have given trouble during the past few years.

For small goods, especially rolls, buns, scones, pork pie paste, a new divider and moulder has proved popular. This is the "Integra" divider and moulder, which has a very large capacity and is of great value in those bakeries which have a large output of smalls that can be handled by such a machine. The moulding is carried out with the minimum of damage to the dough, and, as the photograph shows, this is brought about by a series of four rings which are of different shapes so as to handle the mass of dough as it is moulded tighter. These rings are fitted with felt, the first row, however, being made of wood so as to obtain a better grip on the dough pieces. The divider is the usual four-pocket divider in miniature, although the feed to it is differently designed.

Cake making machines have also continued to increase in popularity, and one of the mechanical improvements of note is the nature of the gear wheels in the Peerless machines. These are now cut at an acute angle so as to produce a silent change. Many engineering experts declared this idea to be an impossible one, but this firm have succeeded in a mechanical development that may have applications in many other spheres and at the same time has brought about a real improvement in the working of their machine. The silent change is very different from the "silent third gear" of so many cars, which is manipulated by the clutch.

Cake depositors have also entered into more general use, and as the number of small medium-priced machines increases, many more businesses will find them of great value in expediting production.



"Integra" Bun and Smalls Divider.
(By courtesy of Baker Perkins, Ltd.)

Raw Materials.

Flour, the most changing of all the baker's raw materials, has shown no tendency of recent years to be any more consistent than previously, nor is there any tendency for it to produce better flavoured bread. With the state of the wheat markets of the world as it is, more consistent products might have been expected.

Although the wheat quota has been in operation for a year now, there have not been many signs of the appearance of

English wheat in the town-milled flours. There have been some millers, however, who have appreciated the value of it and have used as much as 25 per cent. blended with Manitoba, so producing a flour from which good flavoured bread resulted; furthermore, it was a flour suitable for any commercial process. There is a general feeling in some circles that chemical bleaching and treatment of flour is doomed in this country, and attempts to find other means are being carried out intensively. In Germany Rehwald has published some of his work on the use of lecithin as a flour improver. This shows that when lecithin is added to the flour as such it brings about a modification of the gluten so that the dough produced lacks stability, in so far as its ability to produce cottage or crusty bread is concerned, but increases elasticity, making it possible to produce tin bread of good volume and with a more uniform crumb due to the physical modification of the gluten. This crumb is of a greater whiteness, or less intense yellow colour, due to the fine cellular structure of the crumb. In this way it is claimed that results similar to those from bleaching can be obtained. Results somewhat similar in a smaller degree are arrived at by the use of soya flour. With all products containing lecithin, however, the best results only accrue when soft doughs are employed. Soya flour improvers have predominated during the past year, and although the great food value of this product is advocated, the small amount used can hardly bring about a greater nutritive value, since this is offset by the higher water content of the doughs. The effect on the gluten, however, is worthy of consideration.

The use of lecithin in the production of cake making fats and margarines has received attention, because lecithin as such has been found to be an excellent emulsifying agent and so prevents curdling of cake batters. It is remarkable how great is the quantity of eggs which can be incorporated with fat when a very small percentage of lecithin is present.

There has been the usual development of other materials, rendering competition more acute than ever, with new entrants into the fields of essence, marshmallow, and soft icing production.

PLUMS

ACCORDING to a leading article in the *Birmingham Post*, growers of plums in Pershore have experienced a difficulty in obtaining 1s. for a pot of 72 lb. of Pershore plums. At the same time the housewife was experiencing a similar difficulty in getting plums at less than 3d. per lb. There is obviously something wrong here. The middlemen are keeping up prices and not utilising the whole crop. If the growers would formulate some scheme for distributing their own produce, and in times of plenty, such as is the case this year, get their plums into the crowded cities at a price that the poorer people could pay, they would profit thereby. One could reasonably expect 1d. per lb. in the poorest districts for cooking plums. This would mean 6s. for the grower instead of 1s. Surely the costs of transport and distribution would not be anything like 5s. per pot, and with such an arrangement the grower should, at least, quadruple his earnings and poor people would be able to buy fruit that is now prohibitive in price.

LECITHIN

UNPUBLISHED work of Bergell (referred to by Dr. Dragendorff in a discussion on the relative values of egg and vegetable lecithins in *Chemiker-Zeitung* of June 24, page 493) points to the probability that egg lecithin is endowed with some sort of respiratory function even after long storage. Egg lecithin also justifies exceptional attention for several other reasons. It contains the carotinoid lutein, a substance which exerts a marked action upon the organism even when administered in the smallest doses. Vitamins are known to be present which can render service in the treatment of deficiency diseases. Again, egg lecithin is endowed with the valuable property of combining with, and thus to some extent rendering innocuous, the toxins of such diseases as tetanus, tuberculosis, and syphilis. So far as vegetable lecithin—derived, for example, from soya bean—is concerned, it is impossible to lay claim to similar valuable properties with any degree of confidence. In fact, as Dragendorff points out, all observations of the past three decades on the physiological action of lecithin have been based upon the material derived from egg yolk. And the fact that an actual dissimilarity in the chemical structures of the two substances has been noted arouses the suspicion that close investigation may reveal a corresponding divergence in medicinal and nutritive value.—L. L.

FAT CONTENT OF MILK

A CONSIDERATION by J. Mackintosh, O.B.E., of the National Institute for Research in Dairying, of the different factors which can influence the fat content of milk shows that it is by no means a simple matter to state which factor or factors are the main causes in any particular case. Fuller knowledge of the effects of the different circumstances would prevent many rash statements being made, and would also aid farmers and others in deciding which measures are most likely to lead to improvement.

In the *Berkshire Farmers' Year Book* for 1933, Mr. Mackintosh has analysed the factors concerned and has set out the general principles which are worthy of application.

BAKING WITH GLYCERIN

An interesting description by J. Boyd of certain confectionery goods into which glycerin enters as an important ingredient.

SPONGE LOAVES, cakes, and all varieties that come under the category of "sponges" are usually made from a well-balanced formula, including eggs, sugar, and flour. In many instances aerating mediums, such as cream of tartar, soda, etc., are entirely excluded from mixings, resort being had to the air incorporated in the eggs and sugar during the beating process. Sponge cakes of the highest grade may be made by this process. The mixings are changed according to the type of cake that is being manufactured, small cakes having a greater proportion of sugar and eggs than would be used for sponge loaves.

The wholesale food manufacturer, having to contend with keen competition, naturally endeavours to cut down the egg content of his goods, this being the most expensive ingredient used in the making of sponges. This may be done successfully by adding milk, water, and glycerin. It is rather disappointing to the old-fashioned baker to find that sponges made in an unorthodox manner possess good flavour, texture, and are not tough to eat. In addition to these qualities, the products are of good general appearance and keep in a moist condition for several days. The following observations apply to the raw materials used:

Sugar.—A good medium castor sugar is best for all sponge beatings. This is slightly more expensive than other grades, but it always pays eventually to use the best sugar procurable for this class of work.

Eggs.—Fresh, frozen, or glycerinated egg yolk may be used, according to fancy. When the last-mentioned type is used, the glycerin content of the formulæ given below will require to be slightly adjusted.

Flours.—Soft flours are best for sponges; a small percentage of cornflour has been given in the recipes.

Glycerin improves the flavour of the cakes, gives them a fine texture and bloom, prevents drying out, and, in the case of jam rolls, imparts an elasticity to the baked sheets that enables them to be neatly rolled without the surface skin cracking, thus doing away with waste and lost profits.

Sponge Loaves.

¼ pt. eggs.
6½ lb. castor sugar.
2 pt. water.
½ pt. glycerin
2½ oz. cream of tartar.
1½ oz. bicarbonate of soda.
¼ oz. ammonia (powdered).
8½ lb. soft flour.
¼ oz. salt.
½ lb. cornflour.
1 oz. liquid egg colour.

Beat eggs and sugar in the machine until ready; 15 to 20 minutes is the usual time. Bring the water and glycerin to the boiling-point, add to the beaten egg mixture, give a few turns, stop the machine, remove the beater, mix in the flours and aerating powders which have all been hand-sieved together several times, and give a thorough mixing without overdoing it. Scale 10 oz. of the mixture into oblong cake tins which have been cleaned and thoroughly greased, place on baking trays, and bake in medium oven till ready. The sponge loaves, when baked, should have an attractive, bold appearance, and should be removed from the shapes immediately they are withdrawn from the oven.

It should be noted that, after the flour has been mixed into the eggs, etc., the batter should be of a fairly firm consistency. The water must be at the boiling-point when added to the contents of the machine bowl.

If the loaves are to be sold just as they come from the oven, it is best to dust the greased shapes with a mixture of fine castor sugar and rice flour. This gives a nice skin to the baked cakes. The proportions for dusting are:

1 lb. castor sugar.
¼ lb. rice flour.

Iced Sponge Loaves.

Heat sufficient fondant in a suitably sized utensil, flavour with essence of raspberry, and colour a distinct shade with French pink (liquid). Ice the tops of the cakes only.

Valencia Cakes.

Use sponge loaves. Ice top and sides with heated fondant, and roll in browned almond nibs while the fondant is soft. This uses up a considerable quantity of almond nibs, but the price obtained for the cake must be sufficient to cover this expense. On top of each cake pipe a waved line with pink fondant.

Hot, well-boiled apricot jelly, coloured a distinct pink, may be used for coating the cakes in place of fondant, and finished as for the first variety.

Glycerin Loaves.

1 lb. bran.
1½ lb. strong flour.
5½ lb. rough wheatmeal.
2 oz. bicarbonate of soda.
3 oz. cream of tartar.
2 oz. lard.
4 oz. glycerin.
1½ oz. salt.

Make into a slack dough with milk. Scale 1¼ lb. for each loaf and place in oval tins which have been well greased. Bake in medium oven from 1 to 1¼ hours.

Jam Rolls.

1 pt. eggs.
1 pt. milk.
½ pt. glycerin.
2¼ lb. castor sugar.
1 oz. cream of tartar.
½ oz. bicarbonate of soda.
2¼ lb. soft flour.
1 oz. liquid egg colour.

Mix eggs, sugar, glycerin, milk, and colour in a bowl with the hand, then whisk in the flour and chemical substances. Whisk for about 1 minute and pour on to two ordinary sized baking trays which have been greased and lined with paper. Place a fixed upright at the open end of tray, spread the mixture level, and bake in a warm oven.

When the rolls are baked, allow to cool a little, then turn on to a piece of brown paper which has been liberally dusted with castor sugar. Remove the baking paper, spread the roll with good raspberry jam, and roll in the usual manner. Leave till next day, cut the roll into four 1s. pieces or into eight 6d. pieces. After having been dusted on top with icing sugar they are quite ready for sale.

The surface skin of the rolls when baked is beautifully smooth, but if the person responsible neglects dusting the paper with castor sugar the skin created will adhere to the paper and spoil all his efforts. The roll when cut will be of a more "spongy" nature than the machine-made variety and will eat without the slightest indication of toughness. Such rolls cannot be manufactured successfully without glycerin. They will keep soft and moist for a considerable period.

When making a large quantity of these rolls the ingredients are placed in a machine bowl, afterwards proceeding as has been directed for the hand method. Three and a half pints of the batter are measured out and placed on each baking tray. To make pink and chocolate rolls, omit the egg colour.

Small Sponge Cakes.

Grease and dust with flour small sandwich tins. Pour 5 oz. of the above mixture into each tin, place on baking trays or wires and bake in a hot oven. Bake well without discoloration. The cakes will rise to a considerable height in the centre and become nicely cracked. When baked, remove from the tins. When cold, dust on top with dry icing sugar. Do not exhibit for sale until the following day, for, as in the case of rolls, they are inclined to be tough on the day of manufacture. These cakes are beautifully "spongy" five days after being made. They are sold at 3d. each and make quite an appetising tea-cake.

OILS AND FATS

THIS book is intended not only for chemists but for manufacturers who wish to have a general work for reference in the oil and fat industries.

The book is divided into four parts, each part being sub-divided into chapters. Part I. deals with the general classification and composition of the oils; Part II. with the physical and chemical properties; Part III. deals mainly with olive oil, and, in addition, it deals with the physiological action of many other oils, there is also included a fairly detailed account of the developments in the study of vitamins; Part IV. concerns itself with the analysis of oils and fats, and gives a large number of practical analyses of different oils. The last fifty pages are devoted to analytical constants.

On the whole the methods are given with full details, although in one or two cases they seem to be cut rather short; for instance, the melting-point methods are only very briefly mentioned. In other cases, however, there is a possibility of becoming lost in too much detail; this is also applicable to physical tests, to which great importance seems to be attached.

The indexing, although comprehensive, seems to have been carelessly checked during the proof reading, for it will be noticed that under "Methode Kreiss," pages 175, 505, 525, the details actually appear on pages 275, 505, 515.

Apart from these defects the book is well written and contains a comprehensive bibliography and a number of references.

It should prove a most helpful book both to the analyst and to the manufacturer.—H. W. A.

(*"Chimie Analytique et Physiologique des Huiles et Graisses Végétales et Animales," by Daniel Mangrané. 583 pages. Paris*, 1933.)

Increasing Output in Small Chocolate Factories

By means of a variety of simple improvements such as those outlined below, manufacturing costs may be considerably reduced, resulting directly in increased profits or, alternatively, in cheaper selling prices and consequent increased sales. This is a convenient point at which to remind readers that practical information of this kind forms one of the main features of Scarborough's book on "Sweet Manufacture"—just published.

By Harold Thorp, B.Sc.

WHILE SMALL manufacturers have advantages over larger concerns from the point of view of lower overhead charges and a lower wage bill, they generally suffer from the fact that they cannot afford to spend money on the newest machinery and they do not usually employ any research staff whose job it is to improve processes and reduce production costs.

There are, however, several ways in which small manufacturers of chocolate and similar confectionery can considerably increase output (thereby reducing manufacturing costs) without any appreciable capital outlay.

The Water-jacketed Kettle.

In small factories, the usual procedure for covering centres is to supply the workers with chocolate at a higher temperature than required, allowing the individual worker to cool the chocolate in small batches as she uses it to cover creams. From actual observations it has been found, however, that by this method nearly one-third of the total covering time is occupied in tempering the chocolate.

A better system is to supply each worker with a small water-jacketed kettle, sunk in a hole in the bench. The water in the jacket is kept at 2° F. above the covering temperature of the chocolate, either by adding hot water every half-hour or so or by having the jacketed kettle connected to a central tank containing water at the right temperature.

The kettle is filled with chocolate at the covering temperature and the worker dips the centres into the kettle. The process of covering is thus made continuous, and a boy may be employed to refill the kettles with chocolate from a central supply.

By this very simple device output may be increased by 33 per cent.

Cooling the Sweets.

Cooling at room temperature is not very satisfactory, particularly in hot weather, and a better gloss and deeper colour can be obtained merely by using a fan to circulate air over the chocolates. This also reduces the setting time, and where space is valuable it is an important asset to be able to pack the chocolates as soon as possible and use the space to facilitate working.

Refrigeration is, of course, quicker still, but the high cost of installation makes this prohibitive for small firms. Similar results may, however, be obtained by placing blocks of ice near the fan intake. The cost of the ice will be negligible compared with the increase in output due to the greater floor space available. In warm weather the fan will also cool the room and working conditions will be improved.

Boiling and Mixing.

Cream or gum must be boiled and mixed before depositing; this is usually done in a large hopper, quantities being then emptied out into buckets from which the depositor is filled.

Much labour can be saved by having the boiler installed on a platform at a higher level than the depositor, so that the liquid can be run direct into the depositor without having to be moved in buckets.

Depositing Chocolate Centres and Sweets.

Cream centres and sweets are deposited in starch moulds. The single-nozzle depositor sometimes used can with advantage be replaced by a simple ten or twelve nozzle depositor. This may be either bought or made from a **V**-shaped hopper with nozzles at the bottom, suitable drop valves being fitted in each nozzle.

The starch moulds (ten or twelve in a row, corresponding with the number of nozzles in the depositor) are moved under the nozzles and a lever is pressed to release the cream.

By this method the output of one worker can be in-

(*Continued on page* 312.)

GLUTEN BREAD MANUFACTURE

The following account by S. V. Poultney is based on practical experience extending over several years.

HISTORY TELLS us that diabetes mellitus was known in ancient Greece and Rome, and that treatment of the disease by control of the patient's food was probably practised. The original method was merely to limit the amount of food supplied to the sufferer, which generally resulted in rapid exhaustion and death. When it was realised that the starch content of the food was the important factor, and not the total amount of food ingested, there came on to the market products made from bran and similar materials low in starch. These were unpalatable in the extreme, and were unsatisfactory in that, while being low in starch content, they were also low in all the other necessary food elements.

At the beginning of this century, wheat gluten became prominent as a suitable raw material from which a product resembling ordinary bread could be made, but which was at the same time eminently suitable for the diabetic diet. Finally, during the past five years, casein breads and breads made from soya flour have been produced and have proved their value from the medical point of view. The latter, however, have yet to gain the public taste; and it is with the former that this article proposes to deal.

Prepared originally in France, gluten bread was at first imported into this country. Little is known of the methods of preparation at that time, but the product had a flavour resembling dry bran and was about as digestible as wood sawdust. None the less it met with the approval of the medical profession and enjoyed a rapidly increasing sale until the war prevented further importation.

The lot of the diabetic was a most unhappy one during the first years of the war, but towards the end some English manufacturers and one American had commenced experiments, and placed on the market a product that was definitely palatable and digestible and that answered the demands of the medical profession. Since that time the production and consumption of English gluten bread has grown so rapidly and to such proportions that one of the original French companies has now built and equipped a factory over here to compete with our own manufacturers—not only for the English market, but for Dominion trade, which is extensive.

Choice of Flour.

One of the manufacturer's most difficult problems is the choice of a suitable flour for the extraction of gluten. All wheat flours contain gluten, but all do not possess the right quality for the purpose nor in sufficient quantity for economical production. In this respect Canadian flours are superior to all others, with American spring wheats a good second.

The amount of gluten found in the flour is not, of course, directly within the control of the manufacturer or of the miller, but a great deal can be done by the careful selection of wheat or by the extraction of the flour from the first two or three breaks in the mill. As all millers are aware, the first breaks yield a flour of exceptionally high gluten content; and, providing the gluten bread manufacturer is prepared to pay something of a premium for this flour, most millers will supply him. Moreover, the premium is rarely in proportion to the gluten value of the flour, and the manufacturer has the additional advantage of having less bulk to handle and less waste material—mainly starch—of which to dispose. This type of flour also lends itself to packing direct into small bags for re-sale as a high gluten flour, with the admixture of only a small quantity of dried and powdered gluten.

Of commercial flours—as opposed to specially extracted flours—the low-grade patents and first clears are the best, providing they are free from bran. Bran is a definite enemy to the gluten bread maker, as it destroys the elasticity and gas-holding capacity of the gluten. English and Australian flours can be used, but their gluten content is small and they are not economical in production, although the flavour of the bread is superior to the commercial Canadians. Specially selected flours, as mentioned above, have the disadvantage that the natural sweetness of the gluten is lacking.

Starch Extraction.

In the United States, where large quantities of gluten are obtained as a by-product in the manufacture of wheat starch, the whole wheat berry is processed in tanks with water, and subsequently passed between stones which reduce it to a thin cream. The liquor is then screened to remove the coarse bran and finally centrifuged. The starch deposits first in the basket and the gluten is found as a brown scum adhering to the starch cake. This is scraped off, rewashed, and dried *in vacuo*, and finally ground to a fine powder. This product is exceptionally low in starch content, and has the valuable property of taking up water and reforming into "gum" gluten, from which a satisfactory gluten bread can be prepared by the following process:

A blend of English flour and Canadian flour is mixed with dried and ground gluten in the proportion of 10 to 7, and the whole made into a dough with water. About treble the quantity of yeast used in the making of ordinary bread is then incorporated, and the dough proved for about 4 hours. It is then cut into pieces weighing about 2 oz., moulded, and baked in a hot oven for 15 to 20 minutes.

Although the above method produces a good gluten loaf, a more satisfactory—and more usual—method is to prepare fresh gluten from the wheat flour, which experience has shown to be better also than extracting it from the wheat berry.

Gluten Preparation.

The flour is placed in a kneading machine of the type common to bakeries, and made into a medium slack dough with water at about 60° F. This process is so similar to that used in making ordinary bread that no amplification is necessary, except to add that the temperature of the finished dough should not exceed 65° F. This may seem a little difficult, especially in summer, when atmospheric heat, combined with the heat of friction, normally produces a temperature of about 80° F. It is overcome by some manufacturers by the use of chilled water from a refrigerating tank in the mixing process, and by others with the use of ice in a subsequent fermentation process, where correction can be made for any undue rise in temperature at this stage.

The prepared dough, as soon as it is "clear," is transferred to a proving trough or similar receptacle where undue rise in temperature will not take place, and allowed to stand for an hour in order that the gluten shall take up its full amount of water. At the end of this time it is placed in the gluten extracting machine.

Gluten machines are of several types, that most widely known consisting of a finely perforated metal trough in which kneading arms revolve on a horizontal shaft passing through bearings at each end of the machine. A horizontal perforated pipe above the machine directs fine jets of water at considerable pressure on to the dough, and carries away the starch through the sieve into a collecting trough. From this liquor starch is subsequently extracted by centrifuge as a valuable by-product, which incidentally exactly reverses the American process.

Wheat Harvesting at Aldinga, South Australia.

Another less known, but generally more satisfactory, type of machine consists of a flat metal bed surrounded by walls of fine wire mesh, on which a grooved roller revolves to and fro, constantly turning the dough and rolling it into a thin sheet. Fine jets of water directed on to the dough and the roller remove the starch, which passes with the water through the wire mesh walls into a collecting trough, in a similar manner to the machine previously described. Such machines as these will extract gluten from dough at the rate of about 2 cwt. per hour with the minimum of attention.

In England, where the manufacture of gluten foods, despite its rapid progress, is still in an adolescent state, much of the gluten is washed from the dough by hand or by semi-mechanical processes; and manufacturers would be well advised to study Continental and American practice with a view to conserving waste and reducing costs.

Another Australian Harvesting Scene.

Gluten extracted by the above processes is of yellow-grey colour, tough and elastic in consistency, and of high specific gravity. The percentage output from the flour will vary, according to quality and source of supply, from 40 to 60 per cent. in the wet state, equal to 13 to 20 per cent. dry gluten. Exceptional samples of selected flour have been known to yield 23 per cent., but as a general rule a yield of 15 per cent. may be expected.

Gluten Fermentation.

The second stage concerns the fermentation of the gluten. This fermentation is a natural process such as affects most organic substances in a wet state, and the manufacturer's task is to control the rate of fermentation with a view to using the natural ebullition of gas to raise the bread. This is a difficult enough process, and in the absence of adequate scientific control—in this country, at least—it is not surprising that the resulting bread varies considerably in quality.

It must, however, be admitted that the natural fermentation of the gluten produces a better article than the yeast loaf in point of colour and flavour, though the control which yeast makes possible has much to commend it.

The fermentation process varies with the quality of the gluten, and is generally in a sufficiently advanced state in from 16 to 24 hours at a temperature of 55° F. More rapid fermentation can be obtained by raising the temperature, but this has a tendency to produce bread with large gas cavities and a thick crust. In point of fact, the slower the fermentation process the better the bread obtained, since the gas will be more evenly distributed and the degree of fermentation will be more regular throughout the gluten mass. Some experience is necessary at first to determine when the gluten has attained the right condition; but if the processes of dough preparation, gluten washing, and fermentation are conducted at a fixed temperature and over a definite period, much of the human element may be ignored.

It is during this fermentation process that correction may be made for too high temperature of mixing, mentioned above. This is done simply by reducing the temperature of fermentation to give a "steadier" dough. Most manufacturers have cold chambers thermostatically controlling the compressor of the refrigerating plant, and the gluten is stored for the stated time at the required temperature. Manufacturers who do not possess such plants are in the habit of placing ice with the gluten and storing in some type of insulated chest or box. This is very much of a hit-or-miss method, but with experience it can be made to produce excellent results.

The fermented gluten is now removed from the containers in which it has been stored, drained, and weighed ready for the final process. This consists in mixing the wet gluten with wheat flour, proving and baking to produce a loaf of the desired consistency, flavour, and analysis. A good loaf can be prepared from a mixture of two parts of gum gluten to one part of flour. A small quantity of salt and baking fat may be added according to personal views, while other variations in the finished product may be brought about by the addition of casein, soya flour, bran, etc. All these will give a different analysis to the bread and meet the needs of particular classes of consumer.

Final Mixing.

The gum gluten and flour are mixed together in a standard type of mixing machine until the dough is "clear." This mixing action naturally disperses any free gas in the gluten and toughens the mass, and some time must elapse after the mixing is finished before the dough is sufficiently recovered to be handled. The mixing process, which should occupy about 15 minutes, should not raise the temperature of the dough above 80° F., and any tendency to increase above this figure should be controlled, otherwise the bread when baked will be found to lack volume and to have a thick crust.

When the dough has recovered it is usually cut into pieces of several pounds weight, and these are separately divided into pieces weighing from ½ to 2 oz., according to the type and size of loaf required. These pieces are

placed on steel baking sheets with sufficient space between them to permit of a sixfold expansion and baked in a "solid" oven at about 470° F. The type of oven is not material; some manufacturers baking in peel ovens in the presence of steam, some in dry air in steel draw-plate ovens, and others in small travelling ovens of the type used for biscuits and confectionery.

Oven expansion of gluten bread is very rapid, and as the bread is of such light texture the risk of burning the batch is rather greater than with ordinary bread. There is also a critical time and temperature at which the gluten "sets," and this must be determined and adhered to. There is no solidity, or "body," in gluten bread as in household bread, and unless the gluten is completely set and each gas cell holds its shape on leaving the oven, the whole loaf will rapidly collapse. For instance, a too high temperature will give a loaf of good volume and dark colour, but it will shrink on leaving the oven because the interior of the loaf has been insufficiently cooked to "set" the gluten.

On leaving the oven the bread still retains a great deal of moisture, and in order to obtain the crisp, dry texture desired this moisture must be removed. No difficulty is experienced here, as the bread will lose water rapidly at room temperature until it reaches atmospheric humidity; but it is usual to place the bread in a hot cupboard to reduce the drying time and conserve factory space. Temperatures up to 240° F. can be used for drying, although with temperatures above boiling water there is a risk of some colouring of the interior of the loaf unless the water content of the extracted air is controlled. This, however, is a matter that any ventilating or drying engineer can determine with ease.

The dried bread, after cooling, is finally wrapped in parchment bags. These are usually packed into printed cartons, in which the consumer receives them; and provided the product is kept dry and free from outside contamination of any sort, it will retain its texture and palatable flavour for many months.

[*The illustrations included in this article are reproduced by courtesy of the Agent-General for South Australia.*]

STERILISATION OF ICE-CREAM FREEZERS

A. C. DAHLBERG and J. C. MARQUARDT arrived at the following interesting conclusions in their work on the sterilisation of ice-cream freezers (*Bulletin* 628, New York State Agricultural Experiment Station, April, 1933):

The problem of sterilisation of ice-cream freezers has not been studied experimentally to any extent, as it has been assumed that ordinary methods used in the dairy industry would be effective, and freezers have usually not played an important part in ice-cream contamination.

In the present study freezers were sterilised by steam, hot water, and chlorine solution. It was found that chlorine solution did not penetrate the bearings and that bacteria subsequently developed in the wet freezer. The cold refrigerant around the freezer chilled hot water, so that excessively large amounts at very high temperatures were required to sterilise freezers by this means. Heating by steam was slow, but it was entirely possible to sterilise satisfactorily by steam.

Sterilisation of freezers with steam was particularly effective, as it dried them and sterilised the bearings also. Rinsing with chlorine solution prior to use was found to be desirable as a supplement to steam sterilisation.

OILS AND FATS FOR COOKING

AFTER repeated use for frying it is known that oils and fats have an objectionable odour which is imparted readily to foodstuffs. On a large scale, periodical discarding of large quantities of fats is an expensive item and might be avoided if the nature of the changes which occur were known and possible treatment designed. An investigation of the changes which take place in frying oils and fats is reported by Porter, Michaelis, and Shay in *Ind. Eng. Chem.*, 1932, p. 811. It appears from this work that when oils, fats, and hardened oils are heated for a period to the usual cooking temperatures there are no significant changes taking place. When water is present, as in the frying of fresh foods, dough nuts, etc., there is very apparent decomposition, with the formation of free fatty acids, the latter acting catalytically when the quantity reaches 0·75 per cent. The course of the decomposition is probably the formation of fatty acids and glycerin, with subsequent production of acrolein and water. It is stated that an objectionable flavour is noticed when the acidity reaches 2 per cent. calculated as oleic acid.

A BOOK ON GLYCERIN IN BAKING

Bigger Cakes and Better Profits is the title of a handy-sized, 80-page booklet, the second and enlarged edition of which has just been issued by Glycerine, Limited.

The chapters are severally entitled Glycerin in Bread Making, Best Grade Cakes and Exhibition Cakes, Chemical Aeration, Cake Essences, Small Cakes, etc., Sponge Goods, Parkins, Block Gingerbreads, Christmas Puddings, etc., and Almond Paste, Icings, and Little Cakes.

The booklet is well arranged and full of recipes and useful information. The 5-page index at the end is a notable feature.

NUTRITIONAL BREAD

The following selection of recipes incorporating Roman Meal should be of interest to confectioners

ROMAN MEAL is a Canadian product of pronounced diastatic properties, on account of which it is unnecessary to add improvers to produce a loaf of high dietetic value. The following is a recipe from which a typical bread can be made:

Roman Meal Bread.

3 lb. soft flour.
2 lb. Roman meal.
1 lb. wheatmeal.
1½ oz. bicarbonate of soda.
3 oz. cream of tartar.
10 oz. sugar.
8 oz. best treacle.
1½ oz. salt.
1 lb. nut oil.

Make into a soft dough with milk. Scale at 17 oz. for each loaf. Mould into form, place in greased oblong tins, and bake well in a moderate oven. Keep "floury" in appearance on top.

In an endeavour to cater for all tastes we may extend the variety of goods made from Roman meal. A selection of recipes is given below, so that interested readers may have a side-line with which to experiment in an endeavour to create new business and interest among customers.

Fermented Loaves (No. 1).

2 lb. Roman meal.
2 lb. strong flour.
1½ oz. salt.
3 oz. yeast.
1½ pt. water.

Make into a straight dough in the usual manner. The temperature of the dough when finished should be from 70° to 72° F. Place in a warm position and cover with a clean sack for 1 hour. Knead well and scale into required weights. Mould and place in prepared tins and prove from 40 to 45 minutes. Bake in a warm oven at 460° F.

It is essential when making this type of bread to maintain a vigorous fermentation by using plenty of yeast. Also it is necessary to maintain both fermentation and proofing under strict control.

Fermented Loaves (No. 2).

2 lb. Roman meal.
3 lb. strong flour.
2½ pt. water (approx.).
2½ oz. yeast.
2 oz. milk powder.
1 oz. salt.
3 oz. lard.

Make into a good dough. Thoroughly knead, folding and stretching in preference to punching. Prove for 1 hour, then scale into 1 lb. pieces. Mould into form. Place in prepared oblong tins, prove fully, then bake in a moderate oven for 35 minutes.

Roman Scones.

2 lb. soft flour.
2 lb. Roman meal.
2½ oz. cream powder.
1¼ oz. bicarbonate of soda.
8 oz. butter.
10 oz. sugar.
¼ oz. salt.

Dough with milk, as is usual for scones. Scale into 3 oz. pieces. Mould round; then roll out with a rolling pin into 4½ to 5 inch circles. Place on tins and bake in a fairly hot oven. These scones when finished have a somewhat irregular edge, which seems to appeal to customers.

Roman Biscuits.

1 lb. meal.
1 lb. patent flour.
10 oz. butter.
5 oz. sugar.
Pinch of salt.

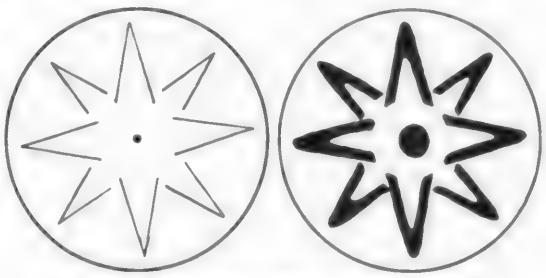
Make into a good dough with water, then roll out to about ¼-inch thickness. Cut with a round cutter; one that docks and cuts simultaneously is the best. Place the biscuits on oven wires and bake in a warm oven.

Roman Cakes.

2½ lb. strong flour.	1¾ lb. syrup.
1½ lb. Roman meal.	1½ oz. bicarbonate of soda.
½ lb. lard.	1½ oz. mixed spice.
½ lb. sugar.	¾ pt. milk.

Make into a firm dough. Scale into 6-oz. pieces. Mould round and flatten out slightly. Have large rounds of tart dough ready on the slab. Brush them over with egg or milk in the centre of each. Place a spiced round and envelop this with the dough. Turn over; wash on top with egg and carve with a small knife a pleasing design. This carving or cutting must be done right through the dough, so that during the baking process the cuttings will open out, thus displaying the spiced filling, which shows up in contrast to the paste covering.

When carving these cakes it is most important that the lines forming the design do not run into each other. Two sketches are appended as a guide.



Roman Cake before (left) and after Baking.

The tart dough for the above consists of:

2 lb. soft flour.
½ lb. lard.
2 oz. sugar.

Make into a fairly firm dough with cold water and pass through the rollers several times.

The spiced filling will keep in good condition for several days provided it is kept in a cool situation.

Roman Spiced Biscuits.

2 lb. meal.
2 lb. soft flour.
10 oz. butter.
12 oz. sugar.
2 oz. bicarbonate of soda.
1 oz. mixed spice.
2 lb. syrup (finest golden).
1 gill milk.

Make into a fairly stiff dough and work well. Scale into 1½-oz. pieces. Mould round. Place on clean, slightly greased tins, and flatten out slightly. Wash on top with a mixture of two parts of milk to one of egg. Bake in a cold oven. The biscuits spread considerably during the baking process, so that allowance must be made for this when placing them on the tins. Note that syrup is the most important ingredient among the materials given in the formula. It should be of best quality and possess good "flowing" qualities. It is always best to run a trial batch of biscuits before proceeding to large scale production.

LOWER PASTEURISING TEMPERATURES

The following communication from Professor W. V. Cruess of the Food Products Laboratory, California, gives an account of his successful endeavour to pasteurise fruit juice at temperatures lower than those ordinarily employed.

AT present fruit juices are usually pasteurised at 180° to 185° F. in cans or in bottles. These temperatures impart a very pronounced cooked taste, a fact that undoubtedly seriously retards increase of sales.

Yeasts are easily killed by heat at 140° F. Some mould spores causing spoilage of juice withstand 180° F., and a minimum of 180° F. must be used to prevent spoilage of juices in which mould may grow. Fortunately, these moulds require oxygen for growth, and if the juices are bottled in carbonated form or cooled in bottles *in vacuo*, or impregnated with an inert gas, such as nitrogen, to displace all air present, the mould spores cannot grow. Also, if the juices are packed in cans the oxygen soon combines with the tinplate, leaving none for the growth of mould.

If the juices are treated and packed in any of the above manners their pasteurisation is greatly simplified, as all that need be accomplished is destruction of the yeasts that may be present. We found in 1914 (see Circular 220 of the Fruit Products Laboratory, California University) that carbonated juices could be kept indefinitely after pasteurising at 150° F. and even lower temperatures. Subsequently (1922) we found that canned juices also could be safely pasteurised at 140° to 150° F. without subsequent mould growth.

During the past three years a careful study of the death temperature of yeast in this laboratory by R. L. Tracy and H. Aref, supplemented by practical tests by H. Aref and J. R. Irish, has demonstrated that a temperature as low as 131° F. is effective in destroying yeast cells. Juices heavily inoculated with yeast cells and resistant mould spores and carbonated in bottles or packed uncarbonated in cans kept perfectly after pasteurising for 2 hours at 130° to 131° F. or for 30 minutes at 140° F.

Sliced fruits and sliced or quartered tomatoes in lightly acidified syrup or lightly acidified brine also have kept perfectly in cans pasteurised at 140° F. They were similar to the fresh in flavour and texture.

We commend these new methods to juice manufacturers and canners for trial, particularly with apple juice, grape juice, citrus juices, sliced peaches in acidified syrup, and quartered tomatoes in acidified brine.

SOYA FLOUR IN BREAD MAKING

By JAMES BELL,
Royal Technical College, Glasgow

IN VIEW of the general interest in the use of soya flour in baking and confectionery, we give below two recipes worked out by James Bell, of the Royal Technical College, Glasgow.

Most people are now familiar with the nutritive qualities of soya flour; the following tables will, however, serve as a reminder:

*Percentage Composition.**

	Soya Flour.	*Finest Wheat Flour.*	*Rye Flour.*	*Oat Flour.*	*Maize Flour.*	*Bean Flour.*	*Pea Flour.*
Water ...	9	13	13	9	13	11	11
Protein ...	42	12	10	14	10	23	26
Fat	20	1½	1½	6	3	2	2
Carbohydrates	25	73	74	67	72	59	57
Ash	4	½	1	2	1	3	3
Calories ...	470	360	356	389	363	357	356

In bread anything from 3 lb. per sack to 25 per cent. in replacement of flour may be used, and as an illustration to what extent nutritive values are increased, the following figures are interesting:

	White Bread.	*10 Per Cent. Soya Bread.*	*22 Per Cent. Soya Bread.*
Proteins	13·13	15·75	20·83
Fat	1·65	3·26	6·05
Starch	80·60	72·23	64·20
Soluble carbohydrates	3·75	6·36	6·50
Fibre	0·39	0·60	0·61
Ash	0·48	1·80	2·20

In using soya flour as a bread improver, two points must be carefully watched. Firstly, owing to the remarkable water absorbing capacity (thus giving a greater yield) additional liquor must be added at the doughing stage (about 2 lb. of extra liquor to every 1 lb. of soya flour is quite a good guide). Secondly, as soya is an excellent yeast food, the rate of fermentation will be accelerated, and this can be overcome by reducing the amount of yeast used. On the other hand, the yeast may remain the same and the time of fermentation be cut down. By using 2½ to 3 lb. per sack (280 lb.) the general appearance of the loaf is improved, and the brightness of the crust is most pleasing to the eye. The texture is also improved and is more even, while the crumb is soft and silky, due to the high protein value. Keeping qualities are naturally enhanced, while the flavour is all that can be desired. Another important point is that when bread contains soya flour it does not tend to go stale as quickly as bread without it.

It must be remembered that to obtain best results the dough must be free, as a tight dough will never give satisfaction, even under the best conditions.

If after trying out the following recipes the baker decides to adopt them, the quantities may be increased as desired, remembering, however, to decrease the ratio of yeast as the quantity of bread increases.

Square Bread.

SPONGE.

6 lb. strong flour.
3 qt. water at 110° F.
3 gills water at 84° F.
2½ oz. yeast.
2 oz. salt.
6½ oz. soya flour.

Turns in 35 to 40 min.

DOUGH.

5 qt. water at 95° F.
12 oz. salt.
26 lb. strong flour.
6 lb. soft flour.

Time in dough, 1¼ hr.

In setting away the sponge, dissolve the salt in the water in a large sponge-tub, then break up the yeast with the 3 gills water at 84° F. Sift the soya flour along with the strong flour and add to the tub. Beat up well and add the yeast water, and continue beating till smooth. Next cover the tub and place in a warm corner till it turns, the time usually taken being from 35 to 40 min. While the sponge is standing, weigh the ingredients for the dough. Just as the sponge is turning, dissolve the 12 oz. of salt in the water at 95° F. and transfer along with the sponge and the flour to a small doughing machine. Dough till smooth, then cover up in a trough and allow it to stand for 1¼ hr. during which time it should be cut back twice. When this period has expired weigh off at 2 lb. 3 oz. per loaf and proceed to mould, prove, and when ready, fire. This recipe gives 2 doz. loaves, which can be fired in the centre of an ordinary batch, or can be increased to suit the size most suitable to the individual baker, remembering, of course, to cut off some of the yeast.

* Readers should note that this is only one of many analyses and that the constitution of soya flours varies considerably according to the methods of preparation involved.

Pan Bread.

STRAIGHT DOUGH.

8 lb. strong flour.
2½ lb. soft flour.
4½ imp. pt. water.
¾ imp. pt. water at 84° F.
4 oz. yeast.
1 oz. lard.
1 oz. sugar.
3 oz. salt.
2½ oz. soya flour.

Time in dough, 1 hr.

Sift both flours together with the soya flour and make a print on the table, into which place the sugar, salt, and lard. Break up the yeast in the ¾ pt. water at 84° F.; then measure off the 4½ pt. water. The temperature of this water is obtained as follows:

Double dough temperature 82° F. × 2 = 164° F.
Subtract flour temperature 65° F. = 65° F.

Water temperature = 99° F.

This calculation is based on the dough temperature being 82° F. when finished, and can be used the same way to suit any dough temperature. Next cream up the sugar, salt, and lard; then pour the 4½ pt. water into the print. When about half of the flour is incorporated, add the yeast water and proceed with the doughing till a smooth silky dough results. Put away in a warm place for 1 hr. and cut back twice during this period. When ready, weigh at 2 lb. and mould. Place in pans and put away in steam-press for about 20 min. The time in the press varies, however, with the rate of fermentation and with the temperature. Allow to prove about three-quarters way up the pan; then place in oven about 450° F. At this temperature the bread should take 40 min. to fire.

THE STRUCTURE OF VITAMIN C

THE issue of *Nature* for August 19, 1933, contained a letter from three workers at the Zürich Technische Hochschule, Drs. Reichstein, Grüssner, and Oppenauer, who claim to have synthesised both natural (*l*-) and *d*-ascorbic acid from the corresponding xylosones. Professor Haworth and his colleagues at Birmingham are occupied with the same problem, though they are attacking it along different lines, and it is hoped that they will achieve the same success as the Zürich workers claim for themselves. The Zürich workers promise publication later of their experimental details and the results of physiological tests on the synthetic product. If their claim is substantiated, ascorbic acid will prove to be the first of the vitamins whose molecular structure is known, and whose complete chemical synthesis has been accomplished.

The whole story of vitamin C investigations is full of interest, and will be told in some detail by Mr. A. L. Bacharach in a forthcoming issue of *The Manufacturing Chemist*, to which readers are referred.

MEAT ACT PROPOSED

A SCHEME for a Meat Act on the lines of the Wheat Act has been approved at a meeting of farmers, landowners, auctioneers, and master butchers held in London recently. It is suggested that a meat commission, representative of producers, wholesalers, retailers, auctioneers, and consumers, should be formed with power to make a levy of 1d. per lb. on all imported beef or mutton. The beef producer would receive from the commission the difference between the average price for the year for prime beef and 48s. a cwt. The suggested payment to the mutton raiser is to be the difference between the average price for the preceding month and 1s. per lb. The scheme is to be circulated in all parts of the country and efforts made to induce the Government to bring it into effect.

Such schemes look very plausible, but they do not always pan out as expected. In the case of wheat it was assumed that the average price would be 25s. 6d. per quarter, but actually, owing to foreign dumping, English wheat is securing lower prices. This means a higher payment from the pool. Already the levy has been raised from 2s. 3d. to 3s. 6d. per sack of flour, and if there is any considerable dumping of French, German, or Russian wheat the levy will probably have to be increased again. Such a state might well happen in the case of meat. Organised interference with the flow of commodities is dangerous and complicated, and the Government will have to tread warily.

WHEAT DUMPING

FRANCE appears to be taking a leaf from Russia's notebook. Two years ago Russia upset the wheat market by wholesale dumping, and now France is doing the same. The French Government has guaranteed a minimum price in France of about 60s. per quarter and also an export bounty of 40s. per quarter. She has about a million quarters surplus wheat for export, and this has been touted on the London market at almost any price it will fetch. As a result, the price of English wheat went down 5s. per quarter. In normal times one would say that this is good for the miller and baker, but our farmers are guaranteed 45s. per quarter, so that every fall in wheat value will have to be met from the wheat subsidy—*i.e.*, by an increased levy on every sack of flour milled. If Britain only grows 6,000,000 quarters, a difference of 5s. per quarter means 1½ million sterling to be found by someone.

BRITISH CANNING

Mr. Vassie replies to his critics

IT IS with considerable reluctance that I enter the throes of a public controversy. I feel, however, that my critics will expect an answer.

Mr. H. V. Taylor maintains a guarded attitude in keeping with his official position. I am pleased to note that he supports me in stressing the necessity for stable conditions governing the supply of raw materials. In stating, however, that it is "a basis obtained through individual contracts of a long-term nature between grower and canner," he makes use of a guarded statement, and does not say whether, under present conditions, such a policy is preferable or not.

I am pleased to see that Mr. Long reveals the evils of fluctuating prices in a much clearer manner than I did. The interrelation between world prices was a factor to which I devoted too little attention. I believe, however, that he will agree that an analysis into comparative costs is a huge study. His comments on fiscal policy are also useful, and I am glad to see that he makes reference to the relation between tariffs and retail prices—a subtle point which falls within the province of the statistician.

Mr. A. L. Matthison calls in question the accuracy of my statistical tables. When I compiled them I, too, felt that something was wrong. I give the relevant figures, however, for his perusal. The table is compiled from the preliminary reports of the fourth Census of Production.

James D. Vassie, M.A.

Kind of Food.	1930 *Quantity. Th. Cwts.*	1930 *Value. £,000*
Preserved meat in tins, glasses, etc. ...	115	834
Meat extracts and essences	97	3,003
Meat and fish pastes in tins and glasses	90	1,198
Fruit preserved without sugar, tinned or bottled	224	300
Fruit in thin or thick syrup, tinned or bottled :		
Plums	21	32
Raspberries	10	36
Strawberries	14	50
Other and unclassified kinds	143	436

Even with the slight inaccuracy in my table due to condensation, the importance of meat products cannot be disputed, unless I have interpreted the figures wrongly. I note that Mr. Matthison considers that Table II. is not sufficiently clear. Had I added an analysis of exports I feel I would have made the table still more complex. The question of inter-Empire trade is one which is well worth analysis. I am not in ignorance of the bodies which he mentions, and must apologise sincerely if the conclusion to be drawn from my article was the "unorganised condition" of the British canning industry. I meant the article to be helpful and suggestive. I did not refer to questions of technique, because I felt that that was the province of the technician.

It seems to me, however, that Mr. Matthison has provided the most pointed criticism of my article. He certainly is an incisive and penetrating thinker, thoroughly conversant with his subject.

It is gratifying to note that Mr. Black finds my views on many points in conformity with his own. Nevertheless, I feel, in company with Mr. Matthison, that my statistical analysis could have been more detailed. Some time ago I was invited to London to conduct research work into a particular aspect of the canning industry. I meant to analyse in detail the character of the consumption of canned goods within the British Empire, the tariffs on canned goods, comparative prices, and the potentialities of the various markets. In short, I meant to undertake a detailed analysis of the prospects of an export trade for British canned goods. Unfortunately, I had subsequently to abandon the entire project.

Many must feel that Mr. Black is right when he says, "Every effort has been made to extend and develop the actual process of canning, and it is to be feared that certain allied factors were not adequately considered at the same time." His elucidation of certain difficulties confronting the evolution of a statesman-like policy is also invaluable. Careful thought would have to be devoted to the constitution of any such scheme. We must win the individual firms to adopt such a policy, showing them the gains to be derived thereby, and not frighten them away from it.

I should again like to draw attention to one of the strongest points in favour of the policy I advocate—namely, the psychological aspect, the effect upon the canners and upon the public. I trust I have made the economic gains to be derived from such a policy sufficiently clear in my article as well as the economic necessity for it.

I think this correspondence has proved that on several points there is a consensus of opinion. My advice is: do not let the movement end in talking, but keep the talking up until it fructifies in positive action.

South Africa

An Undeveloped Market for British Foodstuffs

BRITISH MANUFACTURERS of branded foodstuffs do not seem to realise as widely as they should the excellent market offered for their wares in all parts of South Africa. Certain British tinned and bottled products are well established and exceedingly popular in the Union, but much scope remains for the introduction of many lines common in the British Isles. Jam and preserve manufacturers would meet severe competition from local factories, but in the line of pickles and confectionery the British manufacturer should do better trade.

In an average year the Union spends about £340,000 in imported confectionery, jams, and jellies, and about £175,000 on pickles, sauces, condiments, and spices. Fresh, dried, and preserved fish to an annual value of about £430,000 are imported, and preserved meat to an annual value of at least £136,000. The sales of imported condensed milk are generally over £300,000 a year, of butter and butter substitutes £157,900, and of cheese £37,000. Imported hams, bacon, and salted meats are a small but rising line in which the trade is now worth about £40,000 a year. The biscuit and cake trade is also small, but improving. It is worth about £18,000.

A South African contributor outlines the present situation, and offers a few suggestions to British food manufacturers.

Imports and Home Production.

South Africa has some two thousand factories in which articles of food and drink are manufactured, but in spite of the influence of the many million pounds sterling of goods they produce annually, the South African import trade in articles of food and drink during the last twenty years has increased steadily in value. The 1910 average was less than £6,500,000, but to-day it is not far short of £9,000,000 a year. For this reason it is rather surprising that many British manufacturers of foodstuffs look upon the South African market as not worth their attention. Obviously it would repay keen working.

The import trade of dried, salted, and smoked fish is largely in British hands. Of the 2,800,000 lb. of such fish imported in an average year, at least 2,000,000 lb. is supplied by Great Britain. This trade is not likely to decrease, even in the face of the growing local fishing industry. Great Britain's total trade in articles of food and drink is worth about £1,480,000 a year, and is capable of expansion.

In other African markets the British exporter has to meet the competition of South African manufacturers, who are excellently situated for this trade. South-West Africa has of late increased its foodstuff imports by about 25 per cent. a year, bringing up the total value of the imported foodstuffs consumption to over £500,000. Only 20 per cent. of this trade is supplied by the Union.

In Uganda an excellent market will be found for all types of canned and preserved foodstuffs. South Africa has developed a small but promising market here for various fresh fruits like apples, grapes, and peaches, but it is also finding Kenya a good market for dried fruits, preserves, and wines. In Nyasaland the British exporter has wide scope for the sale of all sorts of tinned foodstuffs.

Dutch *v.* British Chocolate.

British chocolates and sweets are widely bought and widely advertised in the Union and South-West Africa, but the price of such products often restricts their sale. Famous British brands of slab chocolate are offered for sale all over the Union, but if they were reduced to the same price as equally famous brands of Dutch chocolate, which appears to be of equal quality, although cheaper, this business would be increased to a value of several thousand pounds sterling a year. The Dutch exports of chocolate, cocoa, and confectionery to South Africa are worth nearly £50,000 a year. A much better trade is being done in condensed milk, of which at least £140,000 worth from Holland is sold annually.

Meat Extract.

Condensed milk factories have now been established in South Africa, but the venture of greater interest to the British foodstuff manufacturer is the new meat extract factory opened a few months ago in East London. This factory has taken over the large brick building once used as the municipal abattoir. Boilers, cookers, digesters, and vacuum condensers have been installed, and a department with a large capacity ice-making plant, with compressors, tanks, pumps, and motors has been added.

The layout of this plant is in accordance with modern practice. After being taken from the pens, animals are led up an inclined ramp to the killing-box, where they are despatched by means of the humane killer. Carcases then arrive on the mechanical dressing benches, and, dressed and quartered, thence pass along an automatic conveyor to the steam-heated cookers. The liquid is drawn off and run into filters and settling tanks, and the residue of the meat is taken to the long, revolving drier before conversion into such animal foods as meat meal.

In the vacuum condensers the liquid is raised to the necessary consistency to suit the local market, and in the form of a highly concentrated meat extract run into 112-lb. containers. Absence of purity used to be the

main criticism of South African meat products, but such deficiencies are avoided in this factory by the coating of pure refined tin placed in all pipes, tanks, and containers used in the processes. This factory is also manufacturing bone meal, meat meal, and blood powder.

Protective Duties and Preferences.

On account of the increase of South African food manufacturing factories, the Government has placed various protective duties on most canned and preserved foodstuffs landed in the country, but these are fairly well known to most manufacturers who have tried to gain a standing on the Union market. A rebate of ¼d. per lb. is allowed on British and Canadian tinned fish. Rebates are allowed on several foodstuffs from New Zealand, notably cheese and certain types of meats. In spite of Customs duties, British foodstuffs are often sold in South Africa at prices only slightly higher than those charged for local goods.

Since May 5 last the duties on various foodstuffs have been increased. For biscuits the increase is the difference between the old duty of 25 per cent. *ad valorem* and 4d. The old duty on slab chocolate was 30 per cent. or 4d., but this has now been increased by 5 per cent. *ad valorem*. For other types of confectionery the old duty was 35 per cent. or 3½d., and this has been increased by ½d. per lb.

Where the old duty on lard and edible meat fats has not been doubled it has been increased by 1¼d. per lb. For macaroni, spaghetti, and vermicelli the old duty of 30 per cent. has been increased by the difference between that and 2¼d. per lb. The duty on plain cured ham and bacon has been increased by 1d. per lb., bringing it up to 4d. per lb. The duty on cooked or otherwise prepared bacon and ham has been doubled, so that it is now 6d. per lb.

The Government has also decided to ban the import into the Union of all hard-pressed cheese, Gouda and Edam, and most types of pasteurised cheese. This measure is to protect the South African factories, which are now manufacturing first-class cheeses.

Dried Milk and Chocolate Developments.

The Nestlé Milk Company in South Africa intends, among other developments, to erect a complete dried milk plant in its Estcourt factory, which, with the factory at Franklin, is to be enlarged considerably. This plant is expected to satisfy all the country's requirements in dried milk, milk powder, and allied lines. Nestlé also intend to invest £70,000 in a large chocolate factory at Pietermaritzburg. As a climate neither too damp nor too dry is considered essential for the manufacture of chocolate, the Pietermaritzburg site has been selected as the most favourable.

INCREASING OUTPUT IN SMALL CHOCOLATE FACTORIES

(*Continued from page* 301.)

creased to seven or ten times the output obtained with the simple nozzle depositor.

Piling Trays.

Trays filled with starch moulds or sweets can be piled about 7 feet high, and by means of a platform trolley the whole pile may be moved in one operation from the depositing room to the drying ovens or wherever required. The trays are piled on a platform with supporting sides. A trolley is run under the platform and, by means of a lever, the platform and trays together are lifted clear of the floor and can then be wheeled wherever required. By releasing the lever, the platform and trolley are lowered and the trolley can be removed. These platforms form a standard equipment in most large factories for moving heavy material.

Brushing the Sweets.

After the sweets have set in the starch moulds they must be thoroughly brushed to remove all traces of starch. The hand brush has now generally been replaced either by a revolving or a reciprocating brush passed over the sweets, the sweets being placed on a sieve so that the starch falls off below as it is removed. The reciprocating brush gives best results, as it brushes both sides of the sweets.

Packing Sweets.

Improved layouts lead to increased output, and consideration must be given to the position of the benches and accessibility of packing materials and sweets.

If the output warrants it, a conveyor belt about 25 feet long should be used for taking the work to the packers, who are sitting on either side of the belt. At certain definite intervals there are placed on the belt trays of sweets, boxes, corrugated partitions, paper shavings, etc., one operator being responsible for placing the items on definite places marked on the belt.

If the output does not warrant the installation of a conveyor, each packer should be provided with a rack on which the various materials required for packing the sweets should be placed. All materials should be easily accessible and the supply replenished periodically from the back of the racks without interrupting the packer.

TRADE NOTES

Hansella Machinery.

Without doubt one of the chief reasons for the high position occupied by Hansella confectionery machines at the present day is to be found in the personality of the principal of the company.

Mr. Albert Henkel, senior, whose energy is a byword among his colleagues, has for over thirty years made it his business to master the problems of the confectionery trade. Every Hansella machine is designed to meet specific requirements, and a policy of continuous research and practical experiment has resulted in the steady development of equipment which is widely used in up-to-date confectionery works all over the world.

In this country the success of Hansella machines is said to have been cumulative, owing to the number of repeat orders placed by factories in which original installations of one or two units have proved all that can be desired in operation.

Following their usual programme, the Hansella Company are taking advantage of the Confectionery Exhibition to introduce a number of their latest machines, some of which are of outstanding interest by reason of advanced design, and although it would be impossible to show anything like a complete range of equipment, out of the twelve representative machines that will be at Olympia no less than seven are said to be new developments.

* * *

A Booklet on Patents.

The ever-increasing part played by patents and other forms of protection for industrial property makes it most necessary for chemists, engineers, manufacturers and others engaged in industry and commerce to have some knowledge of these subjects, and the brochure on Patents and Trade Marks, written and published by Mr. Benjamin T. King, of King's Patent Agency, Ltd., should prove to be of excellent service in this direction.

The introduction of a new Patents and Designs Act in November, 1932, is sufficient reason for the re-issue of this brochure (copies of which may be had post free from the publishers) before the previous edition is exhausted, for although the new Act does not materially affect the main principles of patent law and practice in this country, the changes it involves are of importance to the inventor and manufacturer. We feel sure that this, the nineteenth edition, following as it does on similar lines to its predecessors, will meet with an equal measure of approval for the valuable information which it contains.

BINDING COPIES OF "FOOD MANUFACTURE."

Binders are now available for binding copies of FOOD MANUFACTURE, and may be had direct from Leonard Hill, Ltd., 231-2, Strand, London, W.C. 2, price 5s. for this country and 7/6 for abroad, post and packing free in both cases.

* * *

"SWEET MANUFACTURE."

For many years there has been a steady demand for a really practical work on the manufacture of sugar confectionery. At last that demand has been satisfied. Information on all branches of sugar confectionery is contained in *Sweet Manufacture*, by N. F. Scarborough, A.M.I., Mech.E.

Visitors to the Confectionery Exhibition at Olympia are invited to examine copies of the work displayed on our stand. The price is 7s. 6d.

The Price of Lecithin.

We regret that a printer's error in our August issue gave the price of lecithin as 1d. per lb. This, of course, is absurd.

The price, at the moment, is more in the neighbourhood of 2s. per lb., but this fluctuates within fairly wide limits, owing to differences in quality and suitability for various purposes.

* * *

Change of Address.

Messrs. B.E.N. Patents, Ltd., have now removed their offices and works to the following address: Gorst Road, Chase Estate, London, N.W. 10. Telephone: Willesden 2066 (4 lines). Their showroom remains as before, at 92, Tottenham Court Road, W. 1. Telephone: Museum 4248.

The same firm has also opened quite recently a sales and service depôt, for the north-west of England area, at 45, Hardman Street, Liverpool. Mr. T. E. Scambler, who has represented B.E.N. interests in that area for several years and is well known in the district, is in charge, and facilities are available for servicing and demonstrating B.E.N. specialities. We understand that, in due course, a comprehensive range of B.E.N. machines and equipment will be carried at the new depôt.

A Section of the Pan and Coil Department at the Rochdale Works of Messrs. William Brierley, Collier and Hartley, Ltd.

Machinery and Belt Guards.

The attention of manufacturers is drawn by Messrs. G. A. Harvey, in their latest "Harco" pamphlet, to the danger of insufficiently protected machinery and belting.

The illustrations contained in the pamphlet are a stronger recommendation than mere words; they show "Harco" wire guards of various shapes and sizes *in situ*, so that their efficiency is plainly demonstrated and needs no comment. Manufacturers interested in any type of guard (ordinary wire or perforated metal) would certainly do well to obtain a copy of the pamphlet from Messrs. G. A. Harvey and Co. (London), Ltd.

* * *

Canadian Recipes.

An excellent piece of propaganda which, although intended primarily for the cook and housewife, should also to some extent interest the smaller manufacturer, is the Maple Leaf Canadian Recipe Book, issued by the Director of Canadian Trade Publicity.

This booklet contains an astonishing variety of recipes, from soup to savoury, and it is worth noting that some of these embody novel ideas which may possibly be worth investigating on a rather larger scale.

* * *

Canning Machinery.

Nobody interested in canning can afford to overlook the latest loose-leaf catalogue issued by Robert Kellie and Son, Ltd., of Dundee.

This includes a range of blanchers, bucket elevators for peas and beans, can-filling conveyors for fruit, exhausters, syruping and pulping machines, fruit and vegetable slicers, coolers, compressors, and a variety of washers. The catalogue is very well arranged and easy of reference. Copies may be had on request.

* * *

Pressure Gauges.

A list of pressure and vacuum gauges has been received from Messrs. William H. Bramall and Company, who state that these instruments are entirely of British manufacture and the result of continuous experience since the foundation of the firm in 1880.

The list also includes "time reminder" clocks for bakeries, thermometers of various designs suitable for industrial purposes, and pyrometers intended for bakers' ovens, boiler flues, or superheated steam.

* * *

De-Greasing.

The British Hydrological Corporation's Commercial Cleaner, Colodol, is a jelly-like body which deserves the attention of all food manufacturers interested in removing "compo," grease, and oil from metal surfaces. In solution, it possesses excellent "wetting" power and is thus able to penetrate the grease coating and separate it from the metal surface. The softer, adhesive portions are thrown to the bottom of the tank and the harder materials emulsified or suspended throughout the solution.

* * *

Canners' Convention.

This year's Annual Canners' Convention will be held at Bristol commencing on the evening of Tuesday, October 31, and closing on Friday morning, November 3.

As at other conventions, a number of conferences will be held on subjects important to the canning industry, but this year special plans are being made, with the active support of the Bristol and District Grocers' Association, to secure the interest of the retailers of Bristol, and the district round about, in British canned fruits and vegetables.

* * *

Imperial Fruit Show.

The Imperial Fruit Show, also to be held in the Coliseum, covers the same period. Preparations for the show are now well advanced, and most of the space available for trade exhibits has been taken. In fact, out of a total of ninety stands, only six in the Fruit Section and five in the Canning Section are unlet, and it is anticipated that these also will be filled in the near future.

In place of the usual Empire Marketing Board exhibit, an Empire Section has been arranged, which will include exhibits by the following fruit-producing Empire countries: Australia, Canada, South Africa, Northern Ireland, Malaya, Cyprus, and, probably, the West Indies. The Ministry of Agriculture will have a large stand in this section for exhibits of fruit produced in Great Britain, and for featuring the National Mark as applied to fruit production.

* * *

Spectacular Display.

A new and spectacular method of staging growers' exhibits will be a prominent feature of the show. Large coloured pictorial canvases, depicting orchard scenes in Great Britain and the Empire countries, will form a pleasing background. The trade stands will also provide a feature in themselves. They have all been designed as a complete scheme in the form of an old English village in Tudor style, which is in keeping with the nature of the show.

A representative Bristol Advisory Committee has been formed, and two meetings have already been held. This committee, under the chairmanship of Mr. W. H. Butt, is working most enthusiastically, and doing everything possible to ensure a thoroughly successful show.

* * *

National Mark Scheme for Jam.

The Minister of Agriculture and Fisheries has given notice of his intention to make regulations under the Agricultural Produce (Grading and Marking) Acts, 1928 and 1931, prescribing a grade designation and a grade designation mark for a "Select (Fresh Fruit) Preserve" grade of jam.

Copies of the draft regulations may be obtained from His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C. 2, or through any bookseller, price 1d.

* * *

Colour Standards and *p*H.

In response to requests for permanent colour standards for *p*H determinations, the Tintometer, Ltd., have co-operated with the British Drug Houses, Ltd., in the production of a handy form of comparator in which the colour produced, on the addition of a measured quantity of indicator to the liquid under examination, is compared with permanent colours prepared with the well-known Lovibond glasses. These colour slides have been established by very careful comparison with solutions of known pH and B.D.H. Indicators. While the manufacturers do not claim that the colours are in every case an exact match of the indicator colours, owing to the brightness of some of the latter, yet they are sufficiently close matches to enable correct identification of the various *p*H values to be made.

Readers interested in this subject would do well to obtain a copy of the pamphlet, "The Lovibond Comparator for the Colorimetric Determination of the *p*H of Liquids," issued from their Colour Laboratory by the Tintometer, Ltd.

* * *

Preservatives.

With regard to the paragraph under the above heading which was published last month, it should be made quite clear that nipagin, nipasol, and nipakombin cannot, under the existing regulations, be used in foodstuffs in this country. Dr. Sabalitschka, who was quoted by us, referred only to the use of these substances in Germany. The position at present, of course, is that sulphur dioxide and benzoic acid are the only preservatives allowed to be used in England for food preserving.

Nipagin and its companion substances find employment in the preserving of cosmetics in this country, but only on the Continent, we understand, in the preserving of foodstuffs.

INFORMATION and ADVICE

FRUIT PULP—PICKLED BEEF FOR EXPORT—MINCEMEAT—FRUIT JUICE—MARASCHINO CHERRIES—VIENNA SAUSAGE IN TINS—TROUBLES IN CHICKEN PACKING—SAUSAGE DISCOLORATION—SUET—LABELLING PASTE—LECITHIN—LACTIC ACID—CONFECTIONERY PROBLEMS

Fruit Pulp.

1,413. *I find this season that I shall have to preserve some of my fruit for jam purposes in bulk, and should be glad if you would give me your opinion as to the suitability or otherwise of the method I propose employing.*

I propose boiling plums and damsons for a period of three minutes under steam pressure in jacketed pans at 35 lb. per sq. in., allowing to cool to approximately 100° F., transferring to casks which have previously been well steamed and dried, and adding SO_2 in the proportion of 1,500 parts by weight, sealing the casks and storing in cool room after well rolling.

I do not propose putting the fruit through a pulping machine, as I find that three minutes' boil at this pressure breaks down the fruit quite well. (Midlands.)

Your method seems to be quite suitable; the only thing is that we think you could simplify it by giving a two or three minutes' boil, and pouring hot—*i.e.*, over 180° F.—into the cask, and then heading up tight.

If the cask has been previously well steamed and the fruit is poured in a hot, boiling condition, and the sealing of the casks is done so that there should be no access of air, then there is really no need for the addition of SO_2. You will, of course, have seen Mr. Potter's article in the July issue of FOOD MANUFACTURE.

There is one point, however, and that is, in order to avoid any danger of fermentation arising from the stones, it is as well to boil the fruit, then put into tubs and stand overnight, and reboil and fill into casks. Of course, blackberries and raspberries should be put through a pulping machine.

Pickled Beef for Export.

1,414. *We are desirous of shipping pickled beef in barrels to the West Indies, and should be glad if you could furnish us with the density of the pickle required to stand the climatic conditions.* (Lancashire.)

In the preparation of this pickled beef, you would follow the ordinary practice of rubbing over the beef with dairy salt and a small percentage of saltpetre, and then packing tight in tanks, and filling up with saturated brine. Stand for several days, and then take out and pack tight in barrels, filling up with strong brine and standing open for a time. Head up, and fill up with brine through the bung-hole.

1,415. *We are desirous of securing a small quantity of pilchards in oil for experimental purposes, but seem unable to procure them.* (Midlands.)

We have been unable to trace a definite source of supply. Perhaps one of our readers can help us?

Mincemeat.

1,416. *With reference to the article on making mincemeat, published in your October, 1932, issue, how long would the product keep if the spices were omitted?* (England.)

If the instructions given are followed, the product should keep for six months.

As spices are preservatives, they will most certainly make a difference. If, however, you decide to leave them out, it will probably be necessary to increase the other preservatives; namely, acetic acid, and any spirits that may be used—*e.g.*, rum.

Of course, you will bear in mind in the preparation of mincemeat the necessity for keeping the utensils perfectly dry, and it is advisable to rub these and the dried fruits over with a cloth which has been soaked in glycerin.

Fruit Juice.

1,417. *We have an enquiry from India asking us to forward catalogues and price lists for plant in connection with the production of fruit essences, syrups, and juices, and we would very much value your help in suggesting names of suitable manufacturers to whom we should apply.* (London.)

It is difficult to give you any definite reply to your question, as it covers such a wide field, and, without particulars as to which process it is intended to follow, it is impossible to specify the type of plant.

If your friends follow American lines of preparing juices from berries and citrus fruits, this would involve some form of crusher. The crushed fruit should be heated in aluminium or glass lined kettles at 150° to 160° F., and then pressed. The juice should be strained, to remove seeds and other material. If required clear, it should be cooled and put through a filter press. After filtration, the juice should be sweetened to 45° to 50° Balling (45 to 50 per cent. sugar) and preserved either by storage at temperatures below 30° F., by treatment with benzoate of soda, or by pasteurisation. For syrup an evaporator will be required.

For the preparation of fruit essences, you should consult an article which we published in the December, 1932, issue.

1,418. *Extensive experiments with and modifications of the cold-mix ice-cream formula appearing on page 338 in the November, 1931, issue have not enabled us to overcome formation of coarse ice-crystals in finished product. Could you offer further advice to counteract this fault? We should also be very grateful for alternative formulæ on which to base experiments.* (Ireland.)

The enquirer was referred to the services of an expert who will probably, in the near future, provide as with a contribution on the subject.

1,419. *I shall be glad if you can inform me of any method whereby I can preserve gelatine glaze so that customers can re-glaze their slabs of beef, etc., by merely heating up the glaze which I supply ready mixed. Owing to its perishable nature, a preservative of some kind would be essential.*

Also I should be glad if you could put me in touch with suppliers of opaque jars for sealed meat pastes. (Lancashire.)

Both these points were dealt with.

1,420. *I am desirous of becoming a member of any Dairy Society which may be in existence in the United Kingdom and which enrols members from India.* (India.)

A suggestion was made.

1,421. *We should be glad if you could furnish us with any information regarding the manufacture of non-alcoholic wines.* (Liverpool.)

A source of information was given.

1,422. *Can you give us any information on the manufacture of prepared suet?* (Gloucester.)

We would refer you to the reply given to enquiry No. 1,387 in the August issue.

Maraschino Cherries.

1,423. *Please favour us with some information on the dyeing of Maraschino cherries.* (Lancashire.)

It is only possible here to give a brief statement, although we have particulars of several methods of preparing these cherries.

Probably it will be best to summarise the results of investigations carried out by workers at the Oregon State College, whose object was to find out the most suitable concentrations of bleach solutions and what substances could be added to the bleach to overcome to some extent the cracking and softening of the fruit. Also to study the effect of the various hardening agents on the absorption of the dye by the fruit, and the firmness, colour, and general appearance of the finished Maraschino cherry.

Slight under-maturity of the cherries is preferable. A 1 to 1½ per cent. SO_2 solution is most satisfactory for bleaching. Sodium sulphite solution may be used for cherries to be dyed or preserved in brine immediately after bleaching, but it is a longer process and not as satisfactory. Among the numerous hardening agents used, precipitated chalk was found superior to hydrated lime. This process was further aided by small additions of tannic acid, magnesium sulphate, and calcium sulphate. The bleach solution is mixed with the hardening ingredients in a separate tank, which permits of agitation while filling the barrels to ensure a uniform mix. Fir barrels coated with paraffin were used, and the most satisfactory weight was 240 lb. of cherries for each 52-gal. (U.S.A.) barrel. More fruit results in excessive expansion, resulting in cracked fruit. The bleaching process is usually completed in 10 days, but better results are obtained if a somewhat longer time is allowed. Roll the barrels at least once or twice a day. Store in a cool basement. Add additional liquid to replace that absorbed by the fruit. The cherries may remain in the bleach for any time up to two or three years. When removed from the bleach the cherries are leached in running water for at least 12 hours. For the dye solution dissolve about 1½ oz. of erythrosine in 12 gal. of water and add ½ to 1 lb. of baking soda for each 100 lb. of fruit. The depth of colour is controlled largely by the amount of dye used and the time of dyeing. Citric acid is added to the dye solution at the rate of ¼ lb. more than the amount of soda used, in order to set the dye. Do not allow iron to come in contact with the cherries or any of the solutions used.

1,424. *Will you please put us in touch with makers of shredding machinery?* (Brighton.)

This was done.

1,425. *We should be obliged if you would put us in touch with Messrs. Fraser, makers of the vacuum sealing machine for glass jars mentioned on page 17 of* FOOD MANUFACTURE, *January*, 1933. (India.)

This was done.

1,426. *Reference your article "Manufacture of Coffee Extract." We wish to use 8 lb. coffee, 10 gal. water, 1 lb. chicory. Kindly give us the exact quantity of glycerin, sugar, glucose, and caramel to be added. Also please state whether in your opinion the proportion of chicory is correct, and whether plain gas is used for boiling or a steam-jacketed pan. If the latter, what pressure is required?* (London.)

The various points raised were dealt with and a basic formula supplied.

1,427. *Will you please supply us with a recipe for making good quality custard powder?* (Notts.)

Reference was made to the August, 1931, issue of this journal.

Vienna Sausage in Tins.

1,428. *Will you kindly give us some idea how to pack Vienna sausage in tins to avoid bursting the casings when retorting?* (Sweden.)

Smoke well in order to toughen the skins. Do not pack too tight. Cook slightly before canning. Sterilising time and temperature will depend on size, shape, and packing of the can.

Troubles in Chicken Packing.

1,429. [*A reader submits to us a detailed account of the troubles he is experiencing in the packing of chicken breasts with jelly in glass, together with samples. The chief difficulty is the formation of a white sediment consisting, according to the analyst's report, mainly of phosphate of lime. The flesh contains 0·14 per cent. and the gelatine flakes used 1·19 per cent. of lime phosphate. The pH value of the gelatine flakes is 5·5, while that of the jelly is 6·5, which shows neutralisation of the acid of the gelatine. What is the origin of this lime phosphate sediment and how can it be cured?*

In preparing the jelly the broth is clarified with albumen and an addition of gelatine is made. The processing is in two stages, in water at 212° F. for 90 minutes and in steam retort at 225° F. for 75 minutes. After the first, the jelly sets nicely, but after steam processing the jelly becomes thin and will not set.

Also, all chicken flavour goes out of the jelly after processing.

These troubles occur even when a superior quality of gelatine is used, supposed to be more or less free from lime.]

This is clearly a job for a consulting canning expert and we suggested that such a person should be invited to study the problem on the spot. Obviously the phosphate of lime must come from somewhere, and on the face of it would appear to result from the interaction of lime dissolved in the water used, with phosphoric acid originally present or formed at some stage in the processing of the gelatine or the meat. To check this we would advise making an experiment using distilled water, or water which has been freed from any calcium compounds. The next step is to examine the gelatine. It would be simple to determine the amounts of lime and phosphoric acid in various samples and to calculate the amounts present per pot and to compare these with the amounts of sediments formed. By some such step by step examination as this, there should be no difficulty in tracking down the source of trouble, but this work must necessarily be carried out on the spot, and therefore in this case we cannot be of any material assistance.

1,430. *Please let us have a formula for wood vinegar; also a formula for lemonade powder.* (London.)

Wood vinegar is simply a solution of acetic acid in water, coloured with caramel.

Such a vinegar usually consists of about five parts of glacial acetic acid, and the amount of caramel can be determined by experiment.

With regard to lemonade crystals, these were described on page 186 of our June, 1932, issue.

1,431. *I wish to get in touch with a firm making a fruit or jelly press.* (London.)

Names were suggested.

1,432. *We should feel very much obliged if you would put us in touch with firms who manufacture rubber tyred trucks and bogies used in conveying goods from one portion of a factory to another.* (Ireland.)

A suggestion was made.

1,433. *We wish to obtain a film dealing with the production and handling of spices.* (Sweden.)

The enquirer was referred to possible sources of supply.

Sausage Discoloration.

1,434. *We should be glad to know what are the causes of discoloration in sausage. How can a fresh appearance be preserved?* (England.)

This presents a very wide field for enquiry. There are many possible causes. If the meat is fresh and the processes are carried out under correct conditions of hygiene and temperature, there should be no trouble. The whole series of operations should be carefully examined, as well as the plant

and utensils used, to track down any possible source or sources of contamination. Temperatures of the meat at each stage should also be checked; at no point should the temperature be allowed to rise above 60° F. The same care should be given to the casings; do not soak them too long or fill them too tight. Keep the proportions of fat and lean constant, and what is important, see that the best, fresh meat is used. Cool in bowls so as to retain the meat juices.

If curing and smoking are employed, other points for consideration, such as temperatures, times, and curing formulæ, are introduced.

1,435. *We notice in the June issue of* FOOD MANUFACTURE *a reference to a publication "The Engineering Aspects of the Condensing and Drying of Milk," and should be glad if you would kindly advise us as to whom we should apply for a copy of this.* (Cheshire.)

Address forwarded.

1,436. *We are interested in enquiry No. 1,331 on page 245 of the July issue of* FOOD MANUFACTURE. (London.)

This was dealt with.

1,437. *We beg to enquire whether you can furnish us with a recipe for the manufacture of shrimp extract.* (Norway.)

We regret that we have not, at the moment, any details concerning the manufacture of shrimp extract apart from those which we have published in a previous issue of this journal.

Suet.

1,438. *With regard to your note on the preparation of suet, it would appear that no refining is done, and it would be interesting to know what happens to the skin and waste tissue.* (London.)

So far as we know, suet is not rendered or refined before putting through the machine. It is, of course, carefully selected and the discoloured parts removed, and also any skin or waste tissue is taken out. The waste tissue, etc., could be rendered to dripping and cracklings.

1,439. *As regular subscribers to your paper we beg to ask you for information on the English import rules for canned meat.*

We want to know what food preservatives are allowed to be used in canned meat, and in what proportion. (Denmark.)

In canned meats, vegetables, and fruits, preservative action is secured by heat sterilisation, and no chemical preservatives are permitted to be added.

1,440. *Can you please supply us with a suitable commercial recipe for Xmas puddings?* (Sunderland.)

We would refer you to information published on page 206 of the July, 1931, issue of FOOD MANUFACTURE.

1,441. *Kindly supply information on the manufacture of meat pastes.* (Ireland.)

See page 210, July, 1932, issue of FOOD MANUFACTURE.

1,442. *I have noticed an article on Apple Baggings in your journal. What are these? For thick sauce making, can gum be added?* (Ireland.)

By "Apple Baggings" Mr. Elsbury means the fibrous part of pulped apples which is retained in the filter bags or presses in the course of the preparation of apple juice. The same applies to any other fruit. Gum, or any of the ordinary ingredients of sauces, could, of course, be used.

Labelling Paste.

1,443. *We shall be obliged if you can give us a formula for an easily prepared paste for labelling bottles.* (Lancashire.)

The most satisfactory way and also the most economical way, no doubt, is to put up your proposition to the adhesive manufacturers. We have already published an article in *The Manufacturing Chemist* on this subject and another article will appear shortly in FOOD MANUFACTURE. It is impossible to give any useful formula without knowing all about your particular requirements and circumstances. However, as an illustration of the general nature of these pastes we quote the following formula which may serve as a basis for your experiments. It should, however, be pointed out that we have had no experience of this trade formula, and so cannot vouch for its reliability.

Distilled water	12 gal.
Wheat flour	10 lb.
Powdered gum arabic	8 ,,
Powdered gum tragacanth	2 ,,
Salicylic acid	4 oz.
Oil of cloves	4 ,,

Dissolve the gums in about 7 gal. of the water by heating, then slowly pour in a batter made of the flour and remaining water. Stir gradually until mixed. Cool. Stir in salicylic acid dissolved in sufficient water, then add oil of cloves.

1,444. *We should like to know of a book dealing with the manufacture of process cheese. The information it contains should be as full as possible. It need not necessarily be in English.* (New Zealand.)

A suitable publication was recommended.

1,445. *I require the names and addresses of manufacturers of casein products.* (London.)

These were given.

1,446. *In recent isues you make reference to maleic acid and we shall be obliged if you will inform us where this may be obtained.* (Scotland.)

Information supplied.

1,447. *We require a formula for pineapple marmalade.* (London.)

This enquirer was recommended to get in touch with a practical expert.

1,448. *In the editorial notes of your July issue there is a reference on page 220 to a Dutch patent with regard to the use of diacetyl for the aromatisation of edible oils. Is it possible for you to inform us where a copy of this patent specification may be obtained? We should also be glad to have the names and addresses of any manufacturers or importers of diacetyl in this country.* (Midlands.)

A source of supply was indicated.

1,449. *With regard to the paragraph which appears in your July issue on Norwegian brisling and the last paragraph of it, can you tell us whether "small herring" includes sild? As you know, sild is small herring, but the Norwegians also pack fat herring in tomato, and it is important for us to know whether the price of sild is to be controlled.* (Scotland.)

The new brisling law does not control sild, except as mentioned under paragraph 3—hermetically packed small herring (mossa) and large and spring-herring packed as kippered-herring or kippers.

Lecithin.

1,450. *With reference to the article "Lecithin in Baking," page 254, August issue,* FOOD MANUFACTURE, *please let us know the supplier of this new lecithin made from the soya bean. We have various samples of lecithin, but most of them are of a treacly consistency and are quite impossible to work into flour.* (London.)

One of the points to notice is that the lecithin should be well kneaded into the flour, and then well worked into the mixture. There are, however, several practical points depending on the particular circumstances under which you are working, which would really require the services of somebody on the spot to put you right by going into your case.

Lactic Acid.

1,451. *We have been approached by some friends with regard to the use of lactic acid in the manufacture of straw-*

berry jam. It has been suggested to us that you would be able to give us full information regarding its use as a preservative in the manufacture of this material. (London.)

Regarding the use of lactic acid in jam, we cannot speak from any experience of this, but on thinking the matter over it appears that there may be something in it.

In many jams, notably strawberry and raspberry, it becomes often necessary to add some citric or tartaric acid, in order to increase the proportion of invert sugar, so as to prevent granulation. These acids are usually added in 20 per cent. solution so as to aid quick distribution in the jam. Lactic acid, being a liquid, would not need previous solution in water as do citric or tartaric acid and should be quite as effective in increasing the proportion of invert sugar.

Moreover, it has been shown that the liability of jam to fermentation and/or mould formation is governed not only by the amount of soluble solids but also by the acidity. The higher the acidity the lower is the safe minimum percentage of soluble solids. In other words, acid will, to some extent, compensate for a deficiency in soluble solids. In certain products, notably mincemeat, salad cream, etc., it has been proved experimentally and by experience that lactic acid is a much more powerful inhibitor of fermentation and mould growth than either citric or tartaric acids, which are themselves fermentable, while lactic acid is not.

1,452. *Can you recommend us a book on chocolate manufacture? It should be a publication of real practical value.* (Scotland.)

Suggestions were made.

1,453. *We beg to enquire whether you can advise us what preservative is allowed in India for the manufacture of jam.* (London.)

The preservative position with regard to India was explained.

1,454. *Can you put us in touch with manufacturers of salicyl parchment paper?* (San Francisco.)

A suggestion was made.

1,455. *We are considering the suggestion of packing cooked meats in sealed glass containers. Could you give us any information as to the process and plant required?* (Midlands.)

This was dealt with and suggestions forwarded.

Confectionery Problems.

1,456. (1) *Can you suggest a method whereby we can prevent sweating and/or graining of boiled sweets before a reasonable period of time—say, three months—without, however, using vacuum or continuous cookers. We are at present using 30 per cent. glucose plus 70 per cent. sugar. Mixture boiled to 310° F., with a pressure of 120 lb. per sq. inch in open steam pans. This sugar mixture is used as a jacket with (apple pulp) fruit filling for satin boilings, and bottled within 2 hours. The actual cooking time is approximately 15 to 20 minutes. If we use 25 per cent. glucose plus 75 per cent. sugar mixture there is more tendency to grain after very slight exposure to atmosphere. Samples of finished sweets enclosed.*

(2) *We are given to understand that borax added to sugar-glucose mixture has the effect of hardening the finished sweet on cooling. From an experiment with same we have verified this. Will you explain the action of this, giving particulars as to what quantity of borax is to be used per cwt. of sugar mixture, and whether or not this complies with the Food and Drug Regulations, and any other information you may have at your disposal on the above subject?*

We shall be extremely grateful to receive your answers at your earliest convenience.

P.S.—*Can you give us recipes for a cheap marzipan and a cheap praline paste for satin confectionery fillings, and process of mixing same?* (England.)

This matter requires thorough investigation, as there are so many possible causes for the trouble. On the face of things there appears to be sufficient glucose, but the boiling temperature seems on the high side, as the batch afterwards is handled quite a lot. The composition of the centre may induce graining.

Borax certainly helps to harden boilings, but its use is not legal, as boric acid is not permitted under the food laws. Other substances can be used which will bring about a similar result, such as citrates, phosphates, etc., and these are permissible. The amount required depends on the composition of the water, etc. The action is one of controlling the hydrogen ion concentration of the boil, formation of excess acid producing inversion.

The composition of cheap marzipan and pralines depends on the allowance for these centres and can be varied to suit circumstances. The principle of manufacture is efficient grinding and mixing through rollers, mixers, etc.

The services of a chemist were recommended.

TRADE ASSOCIATIONS IN THE FOOD INDUSTRY

A Note on American Conditions by a U.S. Correspondent

THE National Recovery Programme in the U.S.A. has thrust the trade associations into the limelight. These associations are charged with the responsibility of formulating codes of fair competition for the branch of industry which they represent, and within recent months many manufacturers have joined up with the trade association in their branch of the industry in order to present a united front.

In general the associations find little difficulty in agreeing on maximum working hours and minimum wages permissible, but problems of what constitutes fair competition have proved more troublesome. Most manufacturers have in the past granted special privileges to large buyers in the way of extra discounts, advertising allowances, free goods, and so on; the small retailers and many manufacturers would like to see these practices abandoned under the codes of fair competition, with each manufacturer publishing a price list which must be rigidly adhered to with no special allowances to favoured customers. This aspect has been holding up the codes of many food industries.

Meanwhile the industry as a whole is operating under the blanket code of the N.R.A., which calls for a maximum working week of 40 hours, not more than 8 hours in any one day, with wages not less than 30 cents per hour for women and 40 cents per hour for men. Food manufacturers are anxious to get their own codes adopted, which will allow them a little more flexibility in the matter of working hours when dealing with perishable products.

In the meantime, public opinion is behind the N.R.A. programme, which has the object of spreading employment and increasing the purchasing power of the workers; and even manufacturers who are liable to be somewhat handicapped by some of the provisions of the blanket code must fall in line or lose their business by the pressure of public opinion.

RECENT TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

RESCA.—539,633. **Sweetmeats and crystallised fruits.** SYBIL NEVILLE-ROLFE, 14, Cromwell Mews, London, S.W. 7. August 2.

VITAMOLT.—541,052. **Malt bread.** VITACREAM, LIMITED, 48, Mark Lane, London, E.C. 3. August 2. (Associated.)

HAYTIME.—542,126. **Biscuits.** BEE BEE BISCUITS, LIMITED, Sutherland Road, Blackpool. August 2. (Associated.)

CAFEREL.—542,435. **Coffee-flavoured caramel, being an ingredient in food.** The firm trading as THE BRITISH DISTRIBUTING COMPANY, 39, Corporation Street, Birmingham. August 2.

SWEETEXA.—542,456. **Edible oils and fats.** THOMAS HEDLEY AND COMPANY, LIMITED, Phœnix Buildings, Collingwood Street, Newcastle-upon-Tyne. August 2.

LADY RHODE.—542,565. **Eggs.** UNITED EGG AND POULTRY PACKERS, LIMITED, Kempshott, Basingstoke. August 2.

GOLDEN GAZELLE.—542,576. **Chocolates.** PAGE AND SHAW, LIMITED, "Chocolate of Excellence Factory," Bath Road, Hounslow, Middlesex. August 2.

MELCO.—540,608. **Packed cereals (for food), pickles, sauces, and canned foods.** W. MELHUISH, LIMITED, 2, Camberwell Green, London, S.E. 5. July 26. (By Consent.)

SATINEX.—541,499. **Caramel, being an ingredient in food.** L. LAMBERT AND CO., LIMITED, Colne Works, High Street, Uxbridge, Middlesex. July 26.

MILO.—542,095. **Bread.** JOHN MILLSON, LIMITED, 36, Salisbury Road, Kilburn, London, N.W. 6. July 26.

BEACHTIME.—542,416. **Biscuits.** BEE BEE BISCUITS, LIMITED, Sutherland Road, Blackpool. July 26.

VITADEX.—541,781. **Sugar confectionery and chocolates.** CONVOY CONFECTIONS, LIMITED, Convoy Works, Albany Street, Newport, Monmouthshire. July 26.

HONEY GLEN. — 542,417. **Biscuits.** BEE BEE BISCUITS, LIMITED, Sutherland Road, Blackpool. July 26.

SANABISK.—540,004. **Wheaten biscuits.** GRANOSE FOODS, LIMITED, Stanborough Park, Watford, Hertfordshire. July 19. (Associated.)

SUNNYBISK.—540,005. **Wheat flake biscuits.** GRANOSE FOODS, LIMITED, Stanborough Park, Watford, Hertfordshire. July 19. (Associated.)

DI-MA.—540,876. **Tea.** S. J. PALMER AND CO., LIMITED, St. Crispin's Buildings, Low Friar Lane, Newcastle-upon-Tyne, 1. July 19.

EXPRESS.—541,107. **Custard powder.** LINCOLNSHIRE PRODUCTS, LIMITED, Express Factory, Norfolk Street, Boston, Lincolnshire. July 19.

SALCAM.—541,626. **Relishes, sauces, pickles, chutney ketchup, and savoury pastes.** EMILY MUIRHEAD-CAMPBELL, 24, St. Edmund's Terrace, London, N.W. 8. July 19.

JAGUAR.—541,878. **Tea.** The firm trading as J. E. WILLIAMS AND SON, 13, Harvey Street, South Parade, Maesteg, Glamorganshire. July 19.

NEUTRALINA.—542,275. **Edible oils and edible fats.** THE SOUTHERN OIL CO., LIMITED, Westinghouse Road, Trafford Park, Manchester. July 19.

RECO.—540,337. **Biscuits.** J. R. PARKINGTON AND CO., LIMITED, 161, New Bond Street, London, W. 1. July 12. (By Consent.)

SWEETAX.—540,870. **Edible oils and fats.** THOMAS HEDLEY AND CO., LIMITED, Phœnix Buildings, Collingwood Street, Newcastle-upon-Tyne. July 12.

VITARMOND.—540,891. **Preparations of powdered almond nuts for use in flavouring food.** VITACREAM, LIMITED, 48, Mark Lane, London, E.C. 3. July 12.

ODIN.—541,169. **Sweetmeats.** TAGE MØLMARK CHRISTENSEN, No. 11, Toldbodgade, Copenhagen, Denmark. July 12.

DAIRY QUEEN.—541,484. **Butter.** WRIGHT AND GREEN, LIMITED, Chatham Buildings, Chester Street, Oxford Road, Manchester. July 12.

PRIDE O' GLEN.—541,880. **Confectionery.** LEES BAKERIES, LIMITED, 2, Eldon Square, Newcastle-upon-Tyne. July 12.

CHOCWAFF.—541,905. **Waffle and cake mixtures.** WAFFLE PRODUCTS CO., LIMITED, 18, Denman Street, London, W. 1. July 12.

WHOOPEE.—541,476. **Beverages (not alcoholic, not medicated, and not aerated).** GALE LISTER AND CO., LIMITED, Galista House, Corn Exchange, Leeds. June 28. (Associated.)

PILGRIM.—541,593. **Bacon and hams.** WILLIAM KINGHAM AND SONS, LIMITED, Queen's Wharf, Reading; 16, 17, and 18, West Street, Farnham; and 16, Eastcheap, London, E.C. 3. June 28.

CANDORCO.—541,764. **Canned foods.** RICHARD CRISPIN AND CO., LIMITED, 56, Gresham Street, London, E.C. 2. June 28.

SYBOL.—536,359. **Edible oils and edible fats for bakery use.** THE PEERLESS REFINING CO. (LIVERPOOL), LIMITED, 49 to 59, Cheapside, Liverpool. June 21.

NEW COMPANIES

(*Continued from page* 320.)

E. RIDLEY AND COMPANY, LIMITED. (273776.) To carry on the bus. of tea, coffee, and produce mchts. and brokers, etc. Nom. Cap.: £500 in £1 shares.

H.P.C. MANUFACTURING COMPANY, LIMITED. (273783.) 9, Cotter Street, Liverpool. To take over the bus. of mnfrs. of potato crisps cd. on at Liverpool as "W. H. Jones and Co." Nom. Cap.: £1,500 in £1 shares.

MORGAN'S TABLE DELICACIES, LIMITED. (273814.) 123, Cannon Street, E.C. 4. To carry on the bus. of mnfg. provisioners, etc. Nom. Cap.: £600 in £1 shares (100 ord. and 500 pref.).

CAVIAR VOLGA, LIMITED. (276285.) To carry on the bus. of mnfrs. and importers of and dlrs. in caviar and foodstuffs of all kinds, etc. Nom. Cap.: £1,000 in £1 shares.

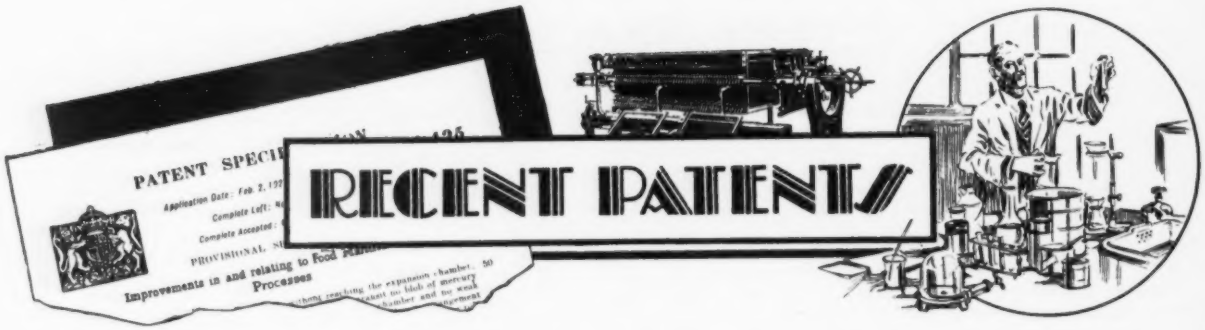
ANGLO BREWING COMPANY, LIMITED. (273381.) To carry on the bus. of brewers, etc. Nom. Cap.: £100 in £1 shares.

IMPROVE-A-CAKE PRODUCTS, LIMITED. (276551.) 33, Eastcheap, E.C. 3. To mnfre., sell, and export an egg substitute, etc. Nom. Cap.: £1,500 in £1 shares.

N. JACK AND COMPANY, LIMITED. (273906.) South Shore Refinery, South Shore Road, Gateshead-on-Tyne. To carry on the bus. of mnfrs. of and dlrs. in fats and frying compounds, oil cakes, soaps, etc. Nom. Cap.: £1,000 in £1 shares (500 pref. and 500 ord.).

W. C. ROSE, LIMITED. (273376.) 220, Trafalgar Road, East Greenwich, S.E. 10. To carry on the bus. of bakers, confectioners, etc. Nom. Cap.: £100 in 1s. shares.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.



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Latest Patent Applications

21192. BELDAM, G. W.: Manufacture of nut food articles. July 28.
21226. BRADFORD, D.: Process for making a tea essence. July 28.
20747. CROSSE AND BLACKWELL, LTD.: Manufacture of chocolate. July 24.
20991. GIBBON, S. H.: Treatment of rice, etc. July 25.
21023. HOGG, T.: Confectionery decorating and filling apparatus. July 26.

Specifications Published

395,773. HAROLD, M. D., and IRISH AGRICULTURAL WHOLESALE SOCIETY, LTD.: Dairy machinery for pasteurisation.
395,834. SCHRAMM, O., LAUENSTEIN, O., LAUENSTEIN, W., and EYERMANN, W. H.: Manufacture of chocolate.
395,508. UNITED FRUIT CO.: Preserving perishables such as fruits, vegetables, and the like in their natural condition.
395,652. FOOD MACHINERY (M. AND P.), LTD. (FOOD MACHINERY CORPORATION): Cooking and cooling apparatus for canned goods.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstract Published

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per group volume, or in bound volumes price 2s. each.

392,009. **Honey.** DYCE, E. J., Guelph, Ontario, Canada.
A fine grained honey product is obtainable by heating honey to a temperature sufficient to destroy the yeast therein, cooling it quickly to a temperature below the melting-points of sugar or honey crystals, adding sugar and/or honey crystals to form nuclei for crystallisation, agitating the mixture and then cooling the mixture to the temperature at which the honey crystallises most rapidly, and maintaining it substantially constantly at this temperature until it is completely crystalline. Air bubbles may be whipped into the honey mixture when it is partially crystallised.

NEW COMPANIES

LISSIMORE AND COMPANY, LIMITED. (274424.) To take over the bus. of mineral water mnfrs. and milk contractors cd. on at Tividale, Staffs, as "Lissimore and Co." Nom. Cap.: £6,000 in £1 shares.

COWLEY'S DAIRIES, LIMITED (274404.) 201, Knightsbridge, S.W. 7. To carry on the bus. of dairymen, etc. Nom. Cap.: £1,000 in £1 shares.

CHAPMAN'S (EALING), LIMITED. (274461.) 2, Station Parade, North Ealing, W. 5. To carry on the bus. of biscuit mnfrs., etc. Nom. Cap.: £500 in £1 shares.

MAGNET CONFECTIONERY COMPANY, LIMITED. (274875.) 385, Corn Exchange Buildings, Fennel Street, Manchester. To take over the bus. cd. on at Manchester as "The Magnet Confectionery Co." Nom. Cap.: £500 in £1 shares.

S. WRIGHT AND COMPANY (WALKERN), LIMITED. (274308.) Walkern, Herts. To take over the bus. of cider and mineral water mnfrs. cd. on at Walkern. Nom. Cap.: £20,000 in £1 shares.

STUBBING AND COMPANY, LIMITED. (274313.) 72, Farringdon Street, E.C. 4. To carry on the bus. of coffee stall proprs., café proprs., etc. Nom. Cap.: £5,100 in £1 shares (5,000 pref. and 100 ord.).

NO-MIX MUSTARD COMPANY, LIMITED. (274957.) 34, Chapter Street, Vauxhall Bridge Road, S.W. 1. To carry on the bus. of mnfrs. of and dlrs. in mustard, sauce, preserves, etc. Nom. Cap.: £2,000 in £1 shares.

PEATMAN BROTHERS, LIMITED. (274587.) Westgate, Ruskington, Lincs. To take over the bus. of bakers, confectioners, and genl. dlrs. cd. on at Ruskington as "Peatman Brothers." Nom. Cap.: £2,000 in £1 shares.

OLIVER AND GURDEN, LIMITED. (274642.) To take over the bus. cd. on at 18-24, George St., Summertown, Oxford, as "Oliver and Gurden," and to carry on the bus. of bakers, confectioners, etc. Nom. Cap: £15,000 in £1 shares.

MANCROFT FOOD PRODUCTS, LIMITED. (274876.) 6, Bank Plain, Norwich. To take over the bus. cd. on by John Copeman and Sons, Ltd., in goods sold under a trade mark consisting of the word Mankroft, and to carry on the bus. of proprs. and mnfrs. of foods, etc. Nom. Cap.: £500 in £1 shares.

OUR MARKET, LIMITED. (274770.) 41, Liverpool Road, Birkdale, Southport. To carry on the bus. of mnfrs. of and dlrs. in greengrocery and provisions, etc. Nom. Cap.: £1,000 in £100 shares.

L. F. KING AND SONS, LIMITED. (274771.) To take over the bus. of a baker and confectioner cd. on at 212, 214, and 247, Holdenhurst Rd., Bournemouth; 880, Wimborne Rd., Moordown, Bournemouth; and at Purewell, Christchurch, Hants, as "L. F. King." Nom. Cap.: £8,000 in £1 shares (4,000 pref.).

ELLAHEENA TEA COMPANY, LIMITED. (274756.) To carry on the bus. of importers, exporters, shippers, and mchts. of tea, coffee, and genl. produce, etc. Nom. Cap.: £100 in 1,340 shares of 1s. and 1,320 shares of 6d.

WADE-WRIGHT CREAMERIES, LIMITED. (274800.) To take over the bus. of an ice cream mnfr. and retailer cd. on at Downham Market. Nom. Cap.: £1,100 in £1 shares.

RD. HODGSON (BLACKBURN), LIMITED. (273722.) Weir Street, Blackburn. To carry on the bus. of mnfrs. of and dlrs. in cork slabs, sectional cork, cork mats, etc. Nom. Cap.: £100 in £1 shares.

TURNER AND COMPANY (BAKERS), LIMITED. (273800.) To take over the bus. of bakers, etc., cd. on at 151, High St., Borough, S.E., as "Turner and Company." Nom. Cap.: £3,000 in £1 shares.

(Continued on page 319.)